

# ANEXE

LA TEZA DE DOCTORAT

## CONTRIBUȚII LA STUDIUL TURBOMAȘINILOR AXIALE NEÎNTUBATE

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## 1. PROGRAME DE CALCUL PENTRU METODA WEIBULL

### 1.1. Programul WEIB07.BAS (asemănător cu WEIBULL0.BAS)

```
REM calcule Weibull ptr FA si FF 2003
CLS
REM INPUT "Vm="; vm
INPUT "k="; k
INPUT "c="; c
INPUT "a="; a
PRINT "k="; k; " c="; c; "a ="; a
PRINT "*****"
PRINT "v      FA      FF"
sumv = 0
sumFF = 0
FOR i = 1 TO 26
LET v = i - 1
LET FA = 8760 * EXP(-((v - a) / c) ^ k)
LET FF = FA / c * k * ((v - a) / c) ^ (k - 1)
sumv = sumv + FF * v
sumFF = sumFF + FF
PRINT USING "#####      "; v; FA; FF
NEXT i
PRINT "Vm[m/s]="; sumv / sumFF
PRINT "SumT[ore/an]="; sumFF
END
```

### 1.2. Programul WEIB\_FF.BAS (asemănător cu WEIB2007.BAS, WEIB08.BAS)

```
REM Fisier WEIB_FF.BAS (RB2011)
REM calcule Weibull pentru FA si FF
CLS
INPUT "vm="; vm
INPUT "Locatia"; loc$
INPUT "Elevatia"; z
INPUT "enter filename"; n$
PRINT "n$="; n$
OPEN n$ FOR OUTPUT AS #1
PRINT #1, "TABEL CU REZULTATELE OBTINUTE CU PROGRAMUL WEIB_FF.BAS"
PRINT #1, "FISIERUL", n$
PRINT #1, "Locatia: "; loc$
PRINT #1, "z="; z; "m"
INPUT "k="; k
INPUT "c="; c
```

```

INPUT "a="; a
PRINT #1, "k="; k; " c="; c; "a="; a
PRINT #1, ""
PRINT #1, " v      FA      FF"
sumv = 0
sumFF = 0
FOR i = 1 TO 26
LET v = i - 1
LET FA = 8760 * EXP(-((v - a) / c) ^ k)
LET FF = FA / c * k * ((v - a) / c) ^ (k - 1)
sumv = sumv + FF * v
sumFF = sumFF + FF
PRINT #1, USING "#####      "; v; FA; FF
NEXT i
PRINT #1, "vm[m/s]="; sumv / sumFF
PRINT #1, "SumT[ore/an]="; sumFF
CLOSE
END

```

### Rezultate obținute cu programul WEIB\_FF.BAS

#### Fișierul Marga10R

TABEL CU REZULTATELE OBTINUTE CU  
PROGRAMUL WEIB\_FF.BAS  
FISIERUL MARGA10R  
Locatia: MARGA  
z= 10 m  
k= 1.6 c= 5.5 a =-.9

| v  | FA   | FF   |
|----|------|------|
| 0  | 8289 | 814  |
| 1  | 7298 | 1122 |
| 2  | 6117 | 1212 |
| 3  | 4920 | 1164 |
| 4  | 3815 | 1036 |
| 5  | 2861 | 868  |
| 6  | 2081 | 694  |
| 7  | 1470 | 531  |
| 8  | 1010 | 392  |
| 9  | 676  | 280  |
| 10 | 442  | 194  |
| 11 | 281  | 130  |
| 12 | 175  | 85   |
| 13 | 107  | 54   |
| 14 | 64   | 34   |
| 15 | 37   | 20   |
| 16 | 21   | 12   |
| 17 | 12   | 7    |
| 18 | 6    | 4    |
| 19 | 3    | 2    |
| 20 | 2    | 1    |
| 21 | 1    | 1    |
| 22 | 0    | 0    |
| 23 | 0    | 0    |

#### Fișierul Marga20R

TABEL CU REZULTATELE OBTINUTE CU  
PROGRAMUL WEIB\_FF.BAS  
FISIERUL MARGA20R  
Locatia: MARGA  
z= 20 m  
k= 1.8 c= 6.9 a =-1.2

| v  | FA   | FF   |
|----|------|------|
| 0  | 8392 | 540  |
| 1  | 7709 | 806  |
| 2  | 6817 | 962  |
| 3  | 5818 | 1020 |
| 4  | 4803 | 999  |
| 5  | 3840 | 919  |
| 6  | 2976 | 803  |
| 7  | 2239 | 670  |
| 8  | 1635 | 537  |
| 9  | 1161 | 414  |
| 10 | 802  | 308  |
| 11 | 538  | 222  |
| 12 | 352  | 154  |
| 13 | 224  | 104  |
| 14 | 139  | 68   |
| 15 | 84   | 43   |
| 16 | 49   | 27   |
| 17 | 28   | 16   |
| 18 | 16   | 9    |
| 19 | 9    | 5    |
| 20 | 5    | 3    |
| 21 | 2    | 2    |
| 22 | 1    | 1    |
| 23 | 1    | 0    |

24            0            0  
 25            0            0  
 vm[m/s]= 4.089484  
 SumT[ore/an]= 8658.112

24            0            0  
 25            0            0  
 vm[m/s]= 5.020408  
 SumT[ore/an]= 8634.964

### 1.3. Programul WRCONST.BAS (asemănător cu WCONST07.BAS)

```

REM Program pentru constantele Weibull determinate din curbele experimentale
REM Cu aceste constante se calculeaza curbele FA si FF
REM Metoda consta in alegerea a doua puncte de pe curba experimentală
REM Cu ajutorul acestor puncte se determina constantele Weibull
INPUT "identificarea amplasamentului"; ampl$
PRINT "DATE DE INTRARE DelTc,v1,v2,FA1,FA2,capr,kapr"
INPUT "DelTc="; DelTc
INPUT "v1="; v1
INPUT "v2="; v2
INPUT "FA1="; FA1
INPUT "FA2="; FA2
INPUT "capr="; capr
INPUT "kapr="; kapr
REM INPUT "Vm="; vm
REM INPUT "k="; k
REM INPUT "c="; c
REM INPUT "a="; a
c = capr: k = kapr
10 a = -c * (LOG(8760 / (8760 - DelTc))) ^ (1 / k)
A1 = LOG(FA1 / 8760): A2 = LOG(FA2 / 8760)
Delv = (v1 - a) / (v2 - a)
k = LOG(A1 / A2) / LOG(Delv)
c = (v1 - a) / (-A1) ^ (1 / k)
vm = .9 * c
PRINT "q=1 se continua iteratia; q=2 se iese din ciclu ;a="; a
INPUT " q= 1 sau 2"; q
IF q = 2 THEN GOTO 20
GOTO 10
20 CLS
PRINT WRCONSTj
INPUT "enter filename"; n$
OPEN n$ FOR OUTPUT AS #1
PRINT #1, "AMPLASAMENT STATIE METEO:"; ampl$
PRINT #1, "k            c            a            vm"
REM PRINT "v            FA            FF"
PRINT #1, k, c, a, vm
PRINT #1, "-----"
PRINT #1, "v            FA            FF"
PRINT #1, "-----"
FOR i = 1 TO 41
LET v = i - 1

```

```
LET FA = 8760 * EXP(-((v - a) / c) ^ k)
LET FF = FA / c * k * ((v - a) / c) ^ (k - 1)
PRINT #1, USING "#####  "; v; FA; FF
NEXT i
CLOSE
END
```

### Rezultate obținute cu programul WRCONST.BAS

#### 1. Fișierul WRTARCU

AMPLASAMENT STATIE

METEO:TARCU(2180)

k                    c                    a                    vm  
 1.768907   11.12172   -1.321803   10.00955

---

| v  | FA   | FF  |
|----|------|-----|
| 0  | 8560 | 265 |
| 1  | 8228 | 392 |
| 2  | 7785 | 489 |
| 3  | 7260 | 558 |
| 4  | 6677 | 603 |
| 5  | 6062 | 624 |
| 6  | 5435 | 627 |
| 7  | 4814 | 613 |
| 8  | 4214 | 585 |
| 9  | 3647 | 548 |
| 10 | 3121 | 503 |
| 11 | 2642 | 455 |
| 12 | 2212 | 404 |
| 13 | 1833 | 354 |
| 14 | 1503 | 306 |
| 15 | 1220 | 261 |
| 16 | 981  | 219 |
| 17 | 780  | 182 |
| 18 | 615  | 150 |
| 19 | 480  | 121 |
| 20 | 371  | 97  |
| 21 | 284  | 77  |
| 22 | 215  | 61  |
| 23 | 162  | 47  |
| 24 | 121  | 36  |
| 25 | 89   | 27  |
| 26 | 65   | 21  |
| 27 | 47   | 15  |
| 28 | 34   | 11  |
| 29 | 24   | 8   |
| 30 | 17   | 6   |
| 31 | 12   | 4   |
| 32 | 8    | 3   |
| 33 | 6    | 2   |
| 34 | 4    | 1   |
| 35 | 3    | 1   |
| 36 | 2    | 1   |

#### 2. Fișierul WRCUNTU

AMPLASAMENT STATIE

METEO:CUNTU(1500)

k                    c                    a                    vm  
 1.591936   4.99488   -1.328002   4.495392

---

| v  | FA   | FF   |
|----|------|------|
| 0  | 7759 | 1129 |
| 1  | 6512 | 1321 |
| 2  | 5188 | 1300 |
| 3  | 3952 | 1157 |
| 4  | 2892 | 958  |
| 5  | 2040 | 748  |
| 6  | 1390 | 556  |
| 7  | 917  | 396  |
| 8  | 587  | 271  |
| 9  | 365  | 179  |
| 10 | 220  | 114  |
| 11 | 130  | 71   |
| 12 | 74   | 42   |
| 13 | 41   | 25   |
| 14 | 23   | 14   |
| 15 | 12   | 8    |
| 16 | 6    | 4    |
| 17 | 3    | 2    |
| 18 | 2    | 1    |
| 19 | 1    | 1    |
| 20 | 0    | 0    |
| 21 | 0    | 0    |
| 22 | 0    | 0    |
| 23 | 0    | 0    |
| 24 | 0    | 0    |
| 25 | 0    | 0    |
| 26 | 0    | 0    |
| 27 | 0    | 0    |
| 28 | 0    | 0    |
| 29 | 0    | 0    |
| 30 | 0    | 0    |
| 31 | 0    | 0    |
| 32 | 0    | 0    |
| 33 | 0    | 0    |
| 34 | 0    | 0    |
| 35 | 0    | 0    |
| 36 | 0    | 0    |

|    |   |   |
|----|---|---|
| 37 | 1 | 0 |
| 38 | 1 | 0 |
| 39 | 1 | 0 |
| 40 | 0 | 0 |

|    |   |   |
|----|---|---|
| 37 | 0 | 0 |
| 38 | 0 | 0 |
| 39 | 0 | 0 |
| 40 | 0 | 0 |

**3. Fișierul WRSEMENIC**

AMPLASAMENT STATIE

METEO:SEMENIC(1432)

|         |          |         |          |
|---------|----------|---------|----------|
| k       | c        | a       | vm       |
| 1.83348 | 7.673838 | -.98273 | 6.906454 |

| v  | FA   | FF  |
|----|------|-----|
| 0  | 8560 | 369 |
| 1  | 8057 | 623 |
| 2  | 7340 | 798 |
| 3  | 6487 | 897 |
| 4  | 5569 | 928 |
| 5  | 4649 | 903 |
| 6  | 3778 | 834 |
| 7  | 2990 | 738 |
| 8  | 2306 | 628 |
| 9  | 1734 | 516 |
| 10 | 1272 | 410 |
| 11 | 911  | 315 |
| 12 | 636  | 236 |
| 13 | 434  | 171 |
| 14 | 289  | 121 |
| 15 | 188  | 83  |
| 16 | 120  | 56  |
| 17 | 75   | 36  |
| 18 | 45   | 23  |
| 19 | 27   | 14  |
| 20 | 16   | 9   |
| 21 | 9    | 5   |
| 22 | 5    | 3   |
| 23 | 3    | 2   |
| 24 | 1    | 1   |
| 25 | 1    | 0   |
| 26 | 0    | 0   |
| 27 | 0    | 0   |
| 28 | 0    | 0   |
| 29 | 0    | 0   |
| 30 | 0    | 0   |
| 31 | 0    | 0   |
| 32 | 0    | 0   |
| 33 | 0    | 0   |
| 34 | 0    | 0   |
| 35 | 0    | 0   |
| 36 | 0    | 0   |
| 37 | 0    | 0   |
| 38 | 0    | 0   |
| 39 | 0    | 0   |
| 40 | 0    | 0   |

**4. Fișierul WRORAVITA**

AMPLASAMENT STATIE

METEO:ORAVITA(308)

|          |          |           |          |
|----------|----------|-----------|----------|
| k        | c        | a         | vm       |
| .9851475 | 3.788274 | -.1690687 | 3.409446 |

| v  | FA   | FF   |
|----|------|------|
| 0  | 8360 | 2277 |
| 1  | 6399 | 1693 |
| 2  | 4918 | 1290 |
| 3  | 3786 | 987  |
| 4  | 2919 | 758  |
| 5  | 2252 | 583  |
| 6  | 1739 | 449  |
| 7  | 1344 | 346  |
| 8  | 1039 | 267  |
| 9  | 804  | 206  |
| 10 | 622  | 159  |
| 11 | 481  | 123  |
| 12 | 373  | 95   |
| 13 | 289  | 74   |
| 14 | 224  | 57   |
| 15 | 173  | 44   |
| 16 | 134  | 34   |
| 17 | 104  | 26   |
| 18 | 81   | 21   |
| 19 | 63   | 16   |
| 20 | 49   | 12   |
| 21 | 38   | 10   |
| 22 | 29   | 7    |
| 23 | 23   | 6    |
| 24 | 18   | 4    |
| 25 | 14   | 3    |
| 26 | 11   | 3    |
| 27 | 8    | 2    |
| 28 | 6    | 2    |
| 29 | 5    | 1    |
| 30 | 4    | 1    |
| 31 | 3    | 1    |
| 32 | 2    | 1    |
| 33 | 2    | 0    |
| 34 | 1    | 0    |
| 35 | 1    | 0    |
| 36 | 1    | 0    |
| 37 | 1    | 0    |
| 38 | 1    | 0    |
| 39 | 0    | 0    |
| 40 | 0    | 0    |

**5. Fișierul WRBOZOVICI**

AMPLASAMENT STATIE

METEO:BOZOVICI(260)

|          |          |           |          |
|----------|----------|-----------|----------|
| k        | c        | a         | vm       |
| .9025921 | 2.024427 | -.1954115 | 1.821984 |

---

| v  | FA   | FF   |
|----|------|------|
| 0  | 7760 | 4345 |
| 1  | 4705 | 2208 |
| 2  | 2987 | 1321 |
| 3  | 1936 | 825  |
| 4  | 1271 | 528  |
| 5  | 843  | 343  |
| 6  | 563  | 225  |
| 7  | 379  | 149  |
| 8  | 256  | 100  |
| 9  | 174  | 67   |
| 10 | 119  | 45   |
| 11 | 81   | 31   |
| 12 | 56   | 21   |
| 13 | 38   | 14   |
| 14 | 27   | 10   |
| 15 | 18   | 7    |
| 16 | 13   | 5    |
| 17 | 9    | 3    |
| 18 | 6    | 2    |
| 19 | 4    | 2    |
| 20 | 3    | 1    |
| 21 | 2    | 1    |
| 22 | 1    | 1    |
| 23 | 1    | 0    |
| 24 | 1    | 0    |
| 25 | 1    | 0    |
| 26 | 0    | 0    |
| 27 | 0    | 0    |
| 28 | 0    | 0    |
| 29 | 0    | 0    |
| 30 | 0    | 0    |
| 31 | 0    | 0    |
| 32 | 0    | 0    |
| 33 | 0    | 0    |
| 34 | 0    | 0    |
| 35 | 0    | 0    |
| 36 | 0    | 0    |
| 37 | 0    | 0    |
| 38 | 0    | 0    |
| 39 | 0    | 0    |
| 40 | 0    | 0    |

**6. Fișierul WRCARANSEBES**

AMPLASAMENT STATIE

METEO:CARANSEBES(241)

|          |          |           |          |
|----------|----------|-----------|----------|
| k        | c        | a         | vm       |
| .9603274 | 3.144408 | -.3493269 | 2.829967 |

---

| v  | FA   | FF   |
|----|------|------|
| 0  | 7760 | 2586 |
| 1  | 5621 | 1775 |
| 2  | 4114 | 1271 |
| 3  | 3027 | 922  |
| 4  | 2236 | 674  |
| 5  | 1656 | 495  |
| 6  | 1229 | 365  |
| 7  | 914  | 270  |
| 8  | 681  | 200  |
| 9  | 508  | 149  |
| 10 | 379  | 111  |
| 11 | 284  | 82   |
| 12 | 212  | 61   |
| 13 | 159  | 46   |
| 14 | 119  | 34   |
| 15 | 89   | 26   |
| 16 | 67   | 19   |
| 17 | 50   | 14   |
| 18 | 38   | 11   |
| 19 | 29   | 8    |
| 20 | 22   | 6    |
| 21 | 16   | 5    |
| 22 | 12   | 3    |
| 23 | 9    | 3    |
| 24 | 7    | 2    |
| 25 | 5    | 1    |
| 26 | 4    | 1    |
| 27 | 3    | 1    |
| 28 | 2    | 1    |
| 29 | 2    | 0    |
| 30 | 1    | 0    |
| 31 | 1    | 0    |
| 32 | 1    | 0    |
| 33 | 1    | 0    |
| 34 | 0    | 0    |
| 35 | 0    | 0    |
| 36 | 0    | 0    |
| 37 | 0    | 0    |
| 38 | 0    | 0    |
| 39 | 0    | 0    |
| 40 | 0    | 0    |



**7. Fișierul WRLUGOJ**

AMPLASAMENT STATIE METEO:LUGOJ(121)

k                      c                      a                      vm  
 1.17081    2.895672    -.4775196    2.606105

---

| v  | FA   | FF   |
|----|------|------|
| 0  | 7760 | 2306 |
| 1  | 5559 | 2003 |
| 2  | 3808 | 1499 |
| 3  | 2537 | 1059 |
| 4  | 1656 | 721  |
| 5  | 1063 | 479  |
| 6  | 673  | 312  |
| 7  | 420  | 200  |
| 8  | 260  | 126  |
| 9  | 159  | 79   |
| 10 | 97   | 49   |
| 11 | 58   | 30   |
| 12 | 35   | 18   |
| 13 | 21   | 11   |
| 14 | 12   | 6    |
| 15 | 7    | 4    |
| 16 | 4    | 2    |
| 17 | 2    | 1    |
| 18 | 1    | 1    |
| 19 | 1    | 0    |
| 20 | 0    | 0    |
| 21 | 0    | 0    |
| 22 | 0    | 0    |
| 23 | 0    | 0    |
| 24 | 0    | 0    |
| 25 | 0    | 0    |
| 26 | 0    | 0    |
| 27 | 0    | 0    |
| 28 | 0    | 0    |
| 29 | 0    | 0    |
| 30 | 0    | 0    |
| 31 | 0    | 0    |
| 32 | 0    | 0    |
| 33 | 0    | 0    |
| 34 | 0    | 0    |
| 35 | 0    | 0    |
| 36 | 0    | 0    |
| 37 | 0    | 0    |
| 38 | 0    | 0    |
| 39 | 0    | 0    |
| 40 | 0    | 0    |

**1.4. Programul WEIBULL.BAS  
 (asemănător cu WEIB2004.BAS)**

REM program pentru constantele Weibull

REM metoda consta in alegerea valorii "Constk "in domeniul 1.05,0.73 Ref.Justus

REM Constantele k, C si A depind de Vm si Constk

```

REM Secventa 1: identificarea constantelor
REM Secventa 2: calcule de timp de asigurare si de frecventa
REM Secventa 3: calcule de energie cinetica unitara [kwh/m2/an
CLEAR
CLS
1 INPUT "Constk= 1.05;.94;.73"; Constk
DIM Vm(10)
DIM k(10)
DIM C(10)
DIM a(10)
DIM ConstC(10)
DIM T0(10)
PRINT "Secventa 1:Constante Weibull"
2 INPUT " Vm= ", Vm
LET k = Constk * SQR(Vm)
LET C = Vm / (-.09562 - .1236 * k + .68605 * SQR(k) + .51928 / k)
LET ConstC = Vm / C
LET T0R = 1 - .344817 / (Vm) ^ 1.65
LET a = -C * (LOG(1 / T0R)) ^ (1 / k)
LET T0 = 8760 - 3050 / Vm ^ 1.65
CLS
PRINT "Constante Weibull Constk="; Constk
PRINT "*****"
PRINT " Vm k C ConstC A T0"
PRINT "*****"
PRINT USING "##.## ##.### ##.### #.### ##.## #####"; Vm; k; C; ConstC; a; T0
INPUT "alta valoare ptr. Constk x=1 cont.program x=2 alta val ptr.Vm x=3"; x
INPUT "pentru end x=5"; x
IF x = 4 THEN END
IF x = 1 THEN GOTO 1
IF x = 3 THEN GOTO 2
PRINT "Secventa 2:calcule Weibull FA(j) si FF(j)"
INPUT "jmax="; jmax
DIM V(jmax)
DIM FA(jmax)
DIM FF(jmax)
LET SUM = 0
FOR j = 1 TO jmax
LET V(j) = j
FA(j) = 8760 * EXP(-((V(j) - a) / C) ^ k)
FF(j) = FA(j) / C * k * ((V(j) - a) / C) ^ (k - 1)
SUM = SUM + FF(j) * V(j)
NEXT j
LET Vmv = SUM / 8760
PRINT "CACULE WEIBULL ptr. FA (ASIGURARE) si FF ( FRECVENTE )"
REM"bini(cutii) cu latime 1 m/s FF*dv=FF*1=FF Atentie ptr.cazul de alt dv"
PRINT "*****"
PRINT "Vm[m/s]= "; Vm
PRINT " V(j) FA(j) FF(j) "
PRINT "*****"

```

```

FOR j = 1 TO jmax
PRINT V(j), FA(j), FF(j)
NEXT j
PRINT "VERIFICARE VITEZA MEDIE: Vm[m/s]="; Vmv
END

```

## 1.5. Programul WEIBA07.BAS

```

REM program pentru constantele Weibull
REM metoda consta in alegerea valorii "Constk "in domeniul 1.05,0.73 Ref.Justus
REM Constantele k, C si A depind de Vm si Constk
REM Secventa 1: identificarea costantelor
REM Secventa 2: calcule de timp de asigurare si de frecventa
REM Secventa 3: calcule de energie cinetica unitara [kwh/m2/an]
REM modificari - realizarea unei iteratii pentru viteza medie rezultata prin integrarea functiei de
frecventa
CLEAR
CLS
1 INPUT "Constk= 1.05;.94;.73"; Constk
DIM vm(10)
DIM k(10)
DIM C(10)
DIM a(10)
DIM ConstC(10)
DIM T0(10)
PRINT "Secventa 1:Constante Weibull"
2 INPUT " Vm= ", vm
Vm0 = vm
INPUT "jmax ="; jmax
DIM V(jmax)
DIM FA(jmax)
DIM FF(jmax)
TW = 8760
10 LET k = Constk * SQR(vm)
LET C = vm / (-.09562 - .1236 * k + .68605 * SQR(k) + .51928 / k)
LET ConstC = vm / C
LET T0R = 1 - .344817 / (vm) ^ 1.65
LET a = -C * (LOG(1 / T0R)) ^ (1 / k)
LET T0 = TW - 3050 / vm ^ 1.65
CLS
PRINT "Constante Weibull Constk="; Constk
PRINT "*****"
PRINT " Vm    k    C    ConstC    A    T0"
PRINT "*****"
PRINT USING " ##.##  ##.###  ##.###  #.###  ##.##  #####"; vm; k; C; ConstC; a; T0
INPUT "alta valoare ptr. Constk x=1 ; cont.program x=2; alta val ptr.Vm x=3;end x=4"; x
IF x = 4 THEN END
IF x = 1 THEN GOTO 1
IF x = 3 THEN GOTO 2

```

```

PRINT "Secventa 2:calcule Weibull FA(j) si FF(j)"
LET sumt = 0
LET SUM = 0
m = 1: n = 1
FOR j = 1 TO jmax
LET V(j) = j - 1
FA(j) = TW * EXP(-((V(j) - a) / C) ^ k)
FF(j) = FA(j) / C * k * ((V(j) - a) / C) ^ (k - 1)
SUM = SUM + FF(j) * V(j)
sumt = sumt + FF(j)
NEXT j
PRINT "SUM/sumt="; SUM / sumt
LET Vmv = SUM / sumt
PRINT "sumt="; sumt
LET Delvm = Vmv - Vm0
LET DelTW = sumt - 8760
PRINT "CALCULE WEIBULL ptr. FA (ASIGURARE) si FF ( FRECVENTE )"
REM"bini(cutii) cu latime 1 m/s FF*dv=FF*1=FF Atentie ptr.cazul de alt dv"
PRINT "*****"
PRINT "Vm0[m/s]="; Vm0; "m="; m; " n="; n; " TW="; TW; " Vm(m / s) = "; vm
PRINT " V(j)      FA(j)      FF(j)  "
PRINT " m/s      ore/an      ore/an"
PRINT "*****"
FOR j = 1 TO jmax
PRINT V(j), FA(j), FF(j)
NEXT j
PRINT "VERIFICARE VITEZA MEDIE: Vm[m/s]="; Vmv
PRINT "verificat timp total: Ttotal ore/an="; sumt
PRINT "DelTW="; DelTW
PRINT "delvm="; Delvm
LET m = Vm0 / Vmv
PRINT "m="; m
n = sumt / 8760
PRINT "n="; n
TW = TW / n
REM LET vm = vm - Delvm: PRINT "Vm corectat="; vm
LET vm = m * vm
INPUT "cont"; cont
GOTO 10
END

```

## 1.6. Programul WEIBULL\_PAS

```

Program corectie_Weibull;
{uses crt;}
Const Tw=8760;
label 1,2,4,10;
Var c,k,constk,vm0,vm,TQ,TOR,sumt,sum,m,n:real;
jmax,x,j:integer;
a:real;

```

```

vmv,constc:real;
V: array[1..100] of real;
FA,FF:array[1..100] of real;
BEGIN
1: writeln;
  writeln('constk=1.05;0.94;0.73');
  writeln;
  write('alege constk=');
  read(constk);
  writeln('Secventa 1: Constante Weibull');
2: write('vm=');
  read(vm);
  vm0:=vm;
10: k:=constk*sqrt(vm);
  c:=vm/(-0.09562-0.1236*k+0.68605*sqrt(k)+0.51928/k);
  constc:=vm/c;
{ TOR:=1-0.344817/exp(1.65*ln(vm));}
  TQ:=TW-3050/exp(1.65*ln(vm));
  a:=-c*exp(ln(ln(8760/TQ))/k);
{ clrscr; }
write('Constante Weibull constk='); writeln(constk:2:2);
writeln('*****');
writeln('  vm    k    c    constc    A    TQ  ');
writeln(' ',vm:2:3,' ',k:2:3,' ',c:2:3,' ',constc:2:3,' ',A:2:3,' ',TQ:2:3);
writeln('*****');
writeln('Alege cifra corespunzatoare variantei:');
writeln('1=alta valoare pentru constk');
  writeln('2=continuare program');
  writeln('3=alta val pt. vm');
  writeln('4=pentru END');
read(x);
if x=4 then goto 4 ;
If x=1 then goto 1 ;
if x=3 then goto 2 ;
writeln;
writeln('Secventa 2: Calcule Weibull FA(j) si FF(j)');
sumt:=0;
sum:=0;
m:=1;n:=1;
write('jmax='); read(jmax);
For j:=1 to jmax do
  begin
    v[j]:=j-1;
    FA[j]:=TW*exp( -exp(k* ln( (v[j]-a)/c) ) );
    FF[j]:=FA[j]*k/C * exp((k-1)*ln((v[j]-a)/c));
    sum:=sum+FF[j]*v[j];
    sumt:=sumt+FF[j];
  end;
writeln('sum/sumt=',sum/sumt:4:3);
vmv:=sum/sumt;

```

```

writeln('sumt=',sumt:4:3);
writeln('CALCULE WEIBULL FA (ASIGURARE) si FF (FRECVENTA)');
writeln('*****');
writeln('Vm0[m/s]=' ,vm0:2:3, ' m=' ,m:1:3, ' n=' ,n:1:3);
writeln('vm[m/s]=' ,vm:2:3);
writeln(' v[j] FA[j] FF[j] ');
writeln(' m/s ore/an ore/an ');
writeln('*****');
For j:=1 to jmax do
  writeln(v[j]:2:1, ' ',FA[j]:6:3, ' ',FF[j]:4:3);
writeln('Verificare viteza medie: vm[m/s]=' ,vmv:2:3);
writeln('Verificare timp total: Ttotal[ore/an]=' ,sumt:4:3);
m:=Vm0/vmv;
writeln('m=' ,m:2:3);
n:=sumt/8760;
writeln('n=' ,n:2:3);
{TW:=TW*n;}
vm:=m*vm;
goto 10;
4: writeln;
END.

```

## Rezultate obținute cu programul WEIBULL\_.PAS

Exemple de rezultate afișate cu acest program sunt prezentate mai jos:

```

constk=1.05;0.94;0.73
alege constk=1.05
Secventa 1: Constante Weibull
vm=4
Constante Weibull constk=1.05
*****
  vm    k      c    constc      A      TQ
  4.000  2.100  4.513  0.886    -0.927  8450.329
*****
Alege cifra corespunzatoare variantei:
1=alta valoare pentru constk
2=continuare program
3=alta val pt. vm
4=pentru END
1
constk=1.05;0.94;0.73
alege constk=0.94
Secventa 1: Constante Weibull
vm=4
Constante Weibull constk=0.94
*****
  vm    k      c    constc      A      TQ
  4.000  1.880  4.500  0.889    -0.768  8450.329

```

\*\*\*\*\*

Alege cifra corespunzatoare variantei:

1=alta valoare pentru constk

2=continuare program

3=alta val pt. vm

4=pentru END

1

constk=1.05;0.94;0.73

alege constk=0.73

Secventa 1: Constante Weibull

vm=4

Constante Weibull constk=0.73

\*\*\*\*\*

| vm    | k     | c     | constc | A      | TQ       |
|-------|-------|-------|--------|--------|----------|
| 4.000 | 1.460 | 4.403 | 0.909  | -0.452 | 8450.329 |

\*\*\*\*\*

Alege cifra corespunzatoare variantei:

1=alta valoare pentru constk

2=continuare program

3=alta val pt. vm

4=pentru END

alege constk=1.05

Secventa 1: Constante Weibull

vm=4

Constante Weibull constk=1.05

\*\*\*\*\*

| vm    | k     | c     | constc | A      | TQ       |
|-------|-------|-------|--------|--------|----------|
| 4.000 | 2.100 | 4.513 | 0.886  | -0.927 | 8450.329 |

\*\*\*\*\*

Alege cifra corespunzatoare variantei:

1=alta valoare pentru constk

2=continuare program

3=alta val pt. vm

4=pentru END

3

vm=6

Constante Weibull constk=1.05

\*\*\*\*\*

| vm    | k     | c     | constc | A      | TQ       |
|-------|-------|-------|--------|--------|----------|
| 6.000 | 2.572 | 6.752 | 0.889  | -1.424 | 8601.383 |

\*\*\*\*\*

Alege cifra corespunzatoare variantei:

1=alta valoare pentru constk

2=continuare program

3=alta val pt. vm

4=pentru END

3

vm=8

Constante Weibull constk=1.05

```
*****
vm      k      c      constc      A      TQ
8.000  2.970  8.944  0.894  -1.979  8661.326
*****
```

Alege cifra corespunzatoare variantei:

1=alta valoare pentru constk

2=continuare program

3=alta val pt. vm

4=pentru END

3

vm=10

Constante Weibull constk=1.05

```
*****
vm      k      c      constc      A      TQ
10.000 3.320 11.105 0.900  -2.577  8691.719
*****
```

Alege cifra corespunzatoare variantei:

1=alta valoare pentru constk

2=continuare program

3=alta val pt. vm

4=pentru END

2

---

Secventa 2: Calcule Weibull FA(j) si FF(j)

jmax=21

sum/sumt=3.085

sumt=8730.990

CALCULE WEIBULL FA (ASIGURARE) si FF (FRECVENTA)

```
*****
```

Vm0[m/s]=4.000 m=1.000 n=1.000

vm[m/s]=4.000

| v[j] | FA[j]  | FF[j]  |
|------|--------|--------|
| m/s  | ore/an | ore/an |

```
*****
```

|      |          |          |
|------|----------|----------|
| 0.0  | 8450.329 | 689.160  |
| 1.0  | 7409.897 | 1351.788 |
| 2.0  | 5856.185 | 1692.107 |
| 3.0  | 4152.372 | 1657.761 |
| 4.0  | 2632.883 | 1349.078 |
| 5.0  | 1489.010 | 934.943  |
| 6.0  | 749.485  | 558.643  |
| 7.0  | 335.143  | 289.750  |
| 8.0  | 132.923  | 130.964  |
| 9.0  | 46.692   | 51.704   |
| 10.0 | 14.508   | 17.854   |
| 11.0 | 3.983    | 5.397    |
| 12.0 | 0.965    | 1.428    |
| 13.0 | 0.206    | 0.331    |
| 14.0 | 0.039    | 0.067    |



|      |       |       |
|------|-------|-------|
| 15.0 | 0.006 | 0.012 |
| 16.0 | 0.001 | 0.002 |
| 17.0 | 0.000 | 0.000 |
| 18.0 | 0.000 | 0.000 |
| 19.0 | 0.000 | 0.000 |
| 20.0 | 0.000 | 0.000 |

Verificare viteza medie:  $v_m[m/s]=3.085$

Verificare timp total:  $T_{total}[ore/an]=8730.990$

$m=1.297$

$n=0.997$

Constante Weibull  $constk=1.05$

\*\*\*\*\*

| vm    | k     | c     | constc | A      | TQ       |
|-------|-------|-------|--------|--------|----------|
| 5.187 | 2.391 | 5.848 | 0.887  | -1.214 | 8558.283 |

\*\*\*\*\*

Alege cifra corespunzatoare variantei:

1=alta valoare pentru constk

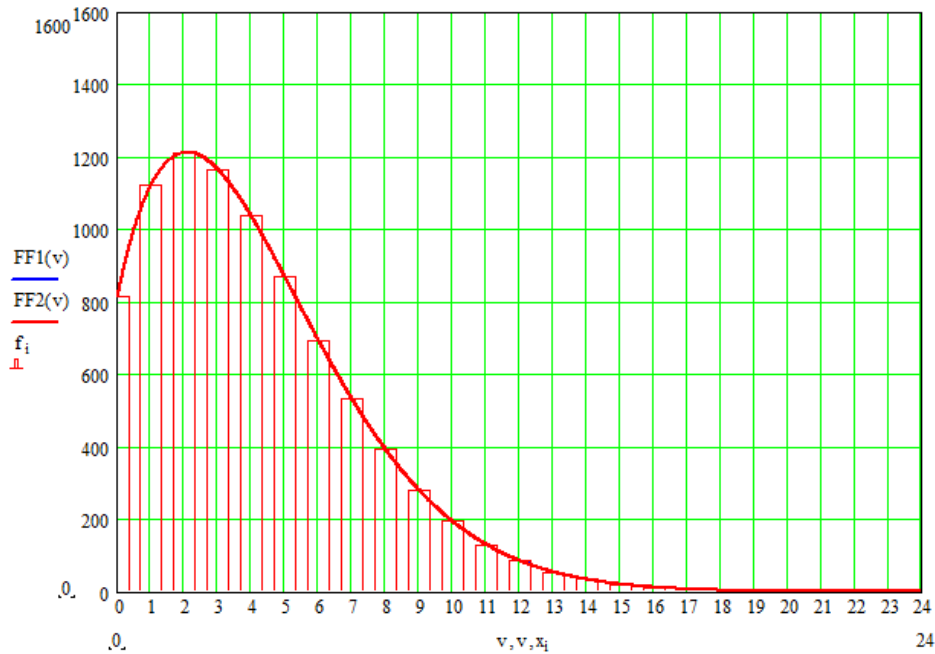
2=continuare program

3=alta val pt.  $v_m$

4=pentru END

## 2. PROGRAME ȘI REZULTATE LA CAPITOLUL 5

| $x_i :=$ | $f_i :=$ | <b>MARGA 10 m</b>  | $i := 1..26$                     |
|----------|----------|--|----------------------------------|
| 0        | 814      | $k1 := 1.6$  | $a1 := -0.9$ (CCAE)              |
| 1        | 1122     | $c1 := 5.5$  |                                  |
| 2        | 1212     | $k2 := 1.6003$   | $a2 := -0.9011$ valori corectate |
| 3        | 1164     |  |                                  |
| 4        | 1036     |  |                                  |
| 5        | 868      | $FA1(v) := 8760 \cdot \exp\left[-\left(\frac{v - a1}{c1}\right)^{k1}\right]$   |                                  |
| 6        | 694      |  |                                  |
| 7        | 531      |  |                                  |
| 8        | 392      | $FF1(v) := \frac{8760}{c1} \cdot k1 \cdot \left(\frac{v - a1}{c1}\right)^{k1-1} \cdot \exp\left[-\left(\frac{v - a1}{c1}\right)^{k1}\right]$ |                                  |
| 9        | 280      |  |                                  |
| 10       | 194      |  |                                  |
| 11       | 130      | $FF2(v) := \frac{8760}{c2} \cdot k2 \cdot \left(\frac{v - a2}{c2}\right)^{k2-1} \cdot \exp\left[-\left(\frac{v - a2}{c2}\right)^{k2}\right]$ |                                  |
| 12       | 85       |  |                                  |
| 13       | 54       |  |                                  |
| 14       | 34       |  |                                  |
| 15       | 20       |  |                                  |
| 16       | 12       |  |                                  |
| 17       | 7        |  |                                  |
| 18       | 4        |  |                                  |
| 19       | 2        |  |                                  |
| 20       | 1        |  |                                  |
| 21       | 1        |  |                                  |
| 22       | 0        |  |                                  |
| 23       | 0        |  |                                  |
| 24       | 0        |  |                                  |
| 25       | 0        | $v := 0, 0.01..26$   |                                  |


 $FF1(x_i) =$ 

|          |
|----------|
| 813.957  |
| 1122.038 |
| 1212.028 |
| 1164.461 |
| 1035.506 |
| 868.225  |
| 693.581  |
| 531.412  |
| 392.305  |
| 279.981  |
| 193.67   |
| 130.108  |
| 85.031   |
| 54.135   |
| 33.613   |
| 20.375   |
| 12.069   |
| 6.99     |
| 3.962    |
| 2.199    |
| 1.196    |
| 0.637    |
| 0.333    |
| 0.171    |
| 0.086    |
| 0.042    |

 $FF2(x_i) =$ 

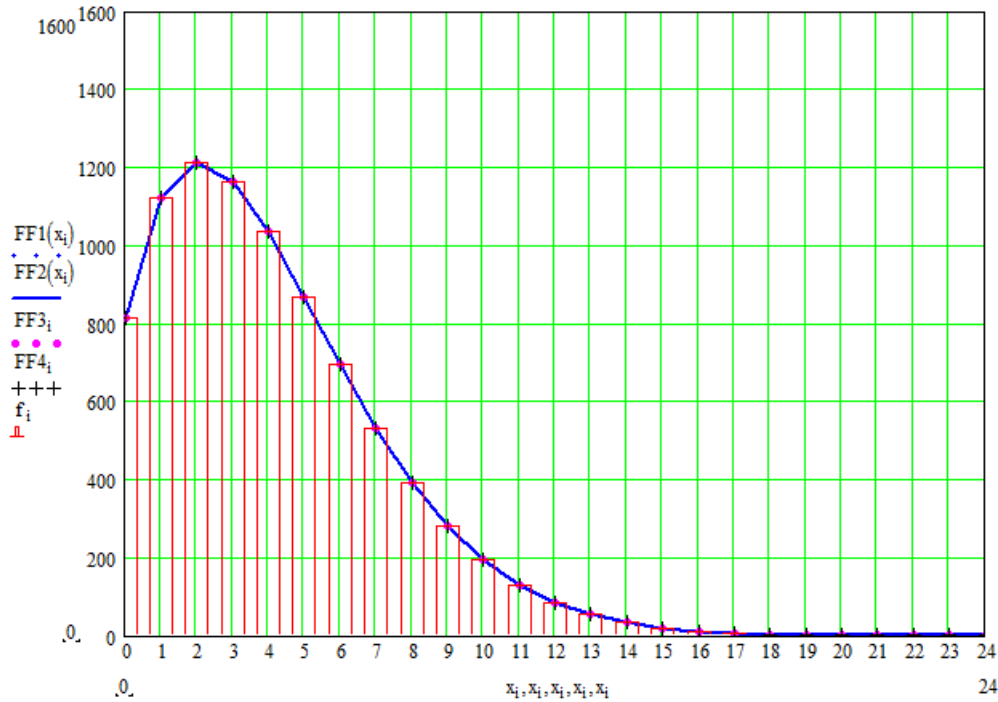
|          |
|----------|
| 814.044  |
| 1121.969 |
| 1211.96  |
| 1164.422 |
| 1035.489 |
| 868.214  |
| 693.565  |
| 531.384  |
| 392.267  |
| 279.937  |
| 193.624  |
| 130.065  |
| 84.993   |
| 54.103   |
| 33.589   |
| 20.357   |
| 12.056   |
| 6.982    |
| 3.956    |
| 2.195    |
| 1.193    |
| 0.636    |
| 0.332    |
| 0.17     |
| 0.086    |
| 0.042    |

 $FF3_i :=$ 

|           |
|-----------|
| 814.01365 |
| 1121.9438 |
| 1211.9480 |
| 1164.4231 |
| 1035.4978 |
| 868.22646 |
| 693.57756 |
| 531.39555 |
| 392.27503 |
| 279.94260 |
| 193.62739 |
| 130.06676 |
| 84.993555 |
| 54.103318 |
| 33.588244 |
| 20.356967 |
| 12.055422 |
| 6.9812250 |
| 3.9560374 |
| 2.1950164 |
| 1.931837  |
| 0.6357565 |
| 0.3321937 |
| 0.170927  |
| 0.0856797 |
| 0.0423250 |

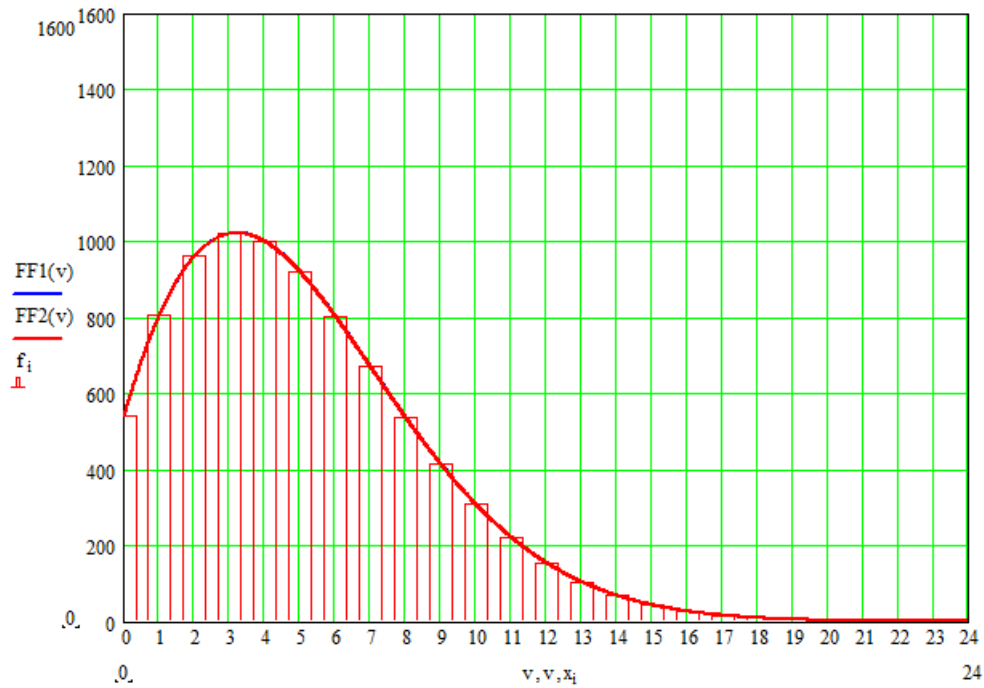
 $FF4_i :=$ 

|           |
|-----------|
| 814.01388 |
| 1121.9438 |
| 1211.9480 |
| 1164.4231 |
| 1035.4979 |
| 868.22659 |
| 693.57769 |
| 531.39567 |
| 392.27512 |
| 279.94267 |
| 193.62743 |
| 130.06679 |
| 84.993571 |
| 54.103325 |
| 33.588246 |
| 20.356966 |
| 12.055420 |
| 6.9812236 |
| 3.9560361 |
| 2.1950154 |
| 1.1931830 |
| 0.6357560 |
| 0.3321934 |
| 0.1702925 |
| 0.0856795 |
| 0.0423249 |

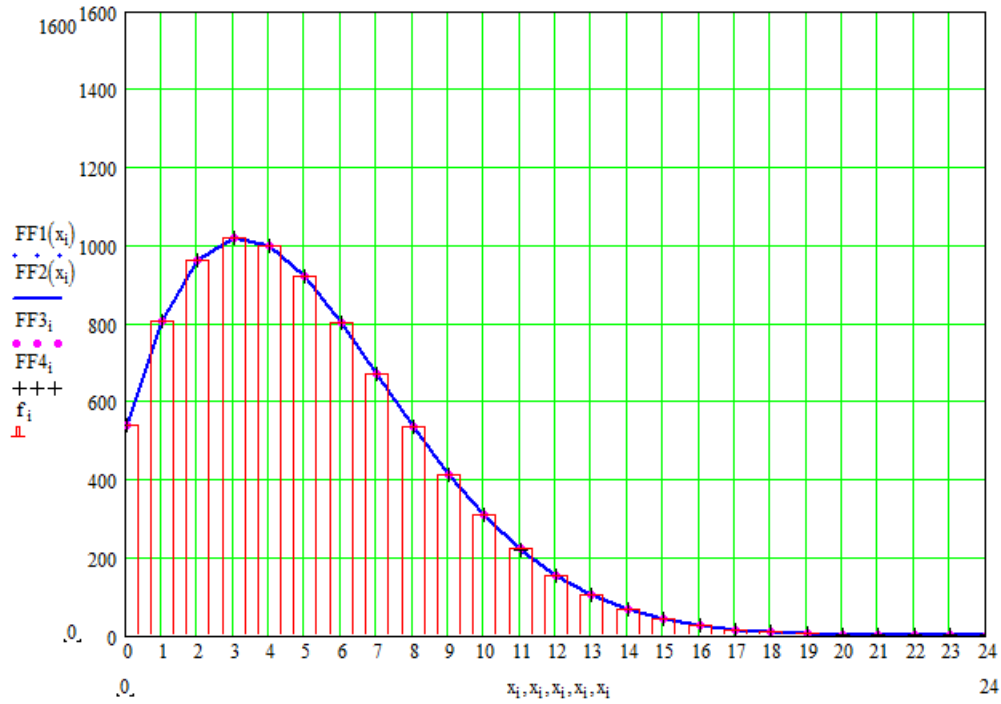


| $x_i :=$ | $f_i :=$ | MARGA 20 m   |                |                 | $i := 1..26$     |
|----------|----------|--|----------------|-----------------|------------------|
| 0        | 540      | $k1 := 1.8$  | $c1 := 6.9$    | $a1 := -1.2$    | (CCAE)           |
| 1        | 806      |  |                |                 |                  |
| 2        | 962      | $k2 := 1.8001$   | $c2 := 6.9015$ | $a2 := -1.2026$ | valori corectate |
| 3        | 1020     |  |                |                 |                  |
| 4        | 999      |  |                |                 |                  |
| 5        | 919      | $FA1(v) := 8760 \cdot \exp\left[-\left(\frac{v - a1}{c1}\right)^{k1}\right]$   |                |                 |                  |
| 6        | 803      |  |                |                 |                  |
| 7        | 670      |  |                |                 |                  |
| 8        | 537      | $FF1(v) := \frac{8760}{c1} \cdot k1 \cdot \left(\frac{v - a1}{c1}\right)^{k1-1} \cdot \exp\left[-\left(\frac{v - a1}{c1}\right)^{k1}\right]$ |                |                 |                  |
| 9        | 414      |  |                |                 |                  |
| 10       | 308      |  |                |                 |                  |
| 11       | 222      |  |                |                 |                  |
| 12       | 154      | $FF2(v) := \frac{8760}{c2} \cdot k2 \cdot \left(\frac{v - a2}{c2}\right)^{k2-1} \cdot \exp\left[-\left(\frac{v - a2}{c2}\right)^{k2}\right]$ |                |                 |                  |
| 13       | 104      |  |                |                 |                  |
| 14       | 68       |  |                |                 |                  |
| 15       | 43       |  |                |                 |                  |
| 16       | 27       |  |                |                 |                  |
| 17       | 16       |  |                |                 |                  |
| 18       | 9        |  |                |                 |                  |
| 19       | 5        |  |                |                 |                  |
| 20       | 3        |  |                |                 |                  |
| 21       | 2        |  |                |                 |                  |
| 22       | 1        |  |                |                 |                  |
| 23       | 0        |  |                |                 |                  |
| 24       | 0        |  |                |                 |                  |
| 25       | 0        |  |                |                 |                  |

$v := 0, 0.01..26$



| $FF1(x_i) =$ | $FF2(x_i) =$ | $FF3_i :=$ | $FF4_i :=$ |
|--------------|--------------|------------|------------|
| 540.202      | 540.784      | 540.35797  | 540.07396  |
| 805.928      | 806.16       | 806.05902  | 805.96721  |
| 961.709      | 961.697      | 961.74273  | 961.71369  |
| 1020.33      | 1020.161     | 1020.2643  | 1020.2308  |
| 999.167      | 998.914      | 999.03370  | 998.96538  |
| 919.459      | 919.181      | 919.30080  | 919.19225  |
| 803.234      | 802.972      | 803.08855  | 802.94935  |
| 670.432      | 670.209      | 670.32486  | 670.17100  |
| 536.993      | 536.817      | 536.93367  | 536.78130  |
| 414.046      | 413.918      | 414.03360  | 413.89528  |
| 308.051      | 307.964      | 308.07600  | 307.95922  |
| 221.56       | 221.506      | 221.60929  | 221.51672  |
| 154.275      | 154.244      | 154.33590  | 154.26665  |
| 104.127      | 104.11       | 104.18881  | 104.13966  |
| 68.191       | 68.184       | 68.248046  | 68.214879  |
| 43.368       | 43.367       | 43.415885  | 43.394572  |
| 26.805       | 26.805       | 26.842273  | 26.829228  |
| 16.112       | 16.113       | 16.139282  | 16.131684  |
| 9.423        | 9.425        | 9.4426188  | 9.4384181  |
| 5.365        | 5.367        | 5.3785607  | 5.3763668  |
| 2.975        | 2.976        | 2.9840396  | 2.9829668  |
| 1.608        | 1.608        | 1.6132015  | 1.6127186  |
| 0.847        | 0.847        | 0.8501251  | 0.8499319  |
| 0.435        | 0.435        | 0.4368559  | 0.4367935  |
| 0.218        | 0.218        | 0.2189746  | 0.2189645  |
| 0.107        | 0.107        | 0.1070972  | 0.1071040  |



**La evaluarea vitezei medii**

$i := 1..7$

$j := 1..7$

Altit<sub>i</sub> :=

vm<sub>i</sub> :=

h<sub>j</sub> :=

$vm1_j := 2 + 0.0029 \cdot h_j$

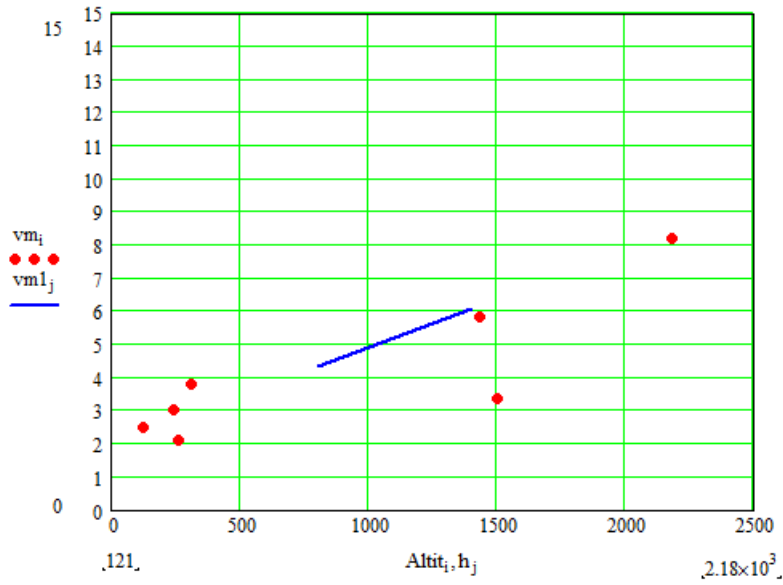
vm1<sub>j</sub> =

|      |
|------|
| 2180 |
| 1500 |
| 1432 |
| 308  |
| 260  |
| 241  |
| 121  |

|      |
|------|
| 8.22 |
| 3.38 |
| 5.84 |
| 3.79 |
| 2.10 |
| 3.03 |
| 2.48 |

|      |
|------|
| 800  |
| 900  |
| 1000 |
| 1100 |
| 1200 |
| 1300 |
| 1400 |

|      |
|------|
| 4.32 |
| 4.61 |
| 4.9  |
| 5.19 |
| 5.48 |
| 5.77 |
| 6.06 |



$$Pcu_i := 1.2 \cdot (vm_i)^3$$

$$Ecu_i := 8760 \cdot Pcu_i$$

Pcu<sub>i</sub> =

|         |
|---------|
| 666.495 |
| 46.337  |
| 239.012 |
| 65.328  |
| 11.113  |
| 33.382  |
| 18.304  |

Ecu<sub>i</sub> =

|                         |
|-------------------------|
| 5.838 · 10 <sup>6</sup> |
| 4.059 · 10 <sup>5</sup> |
| 2.094 · 10 <sup>6</sup> |
| 5.723 · 10 <sup>5</sup> |
| 9.735 · 10 <sup>4</sup> |
| 2.924 · 10 <sup>5</sup> |
| 1.603 · 10 <sup>5</sup> |

$$\alpha := 0.3$$

$$vm50_j := vm1_j \cdot \left(\frac{50}{10}\right)^\alpha$$

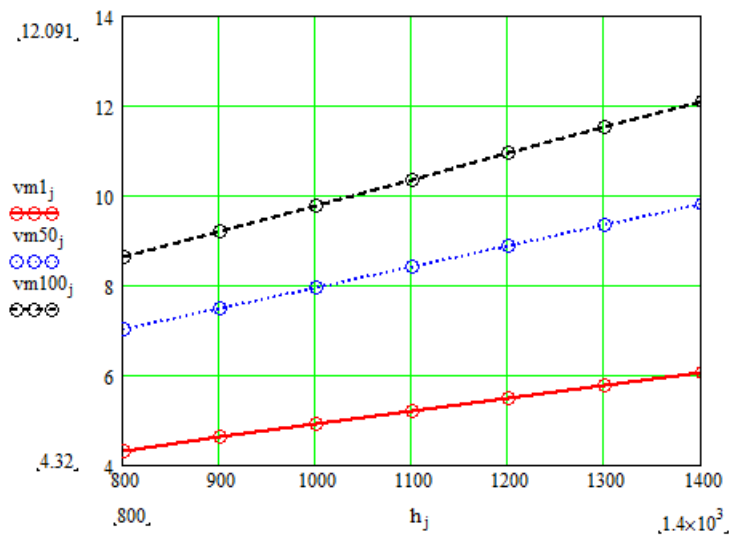
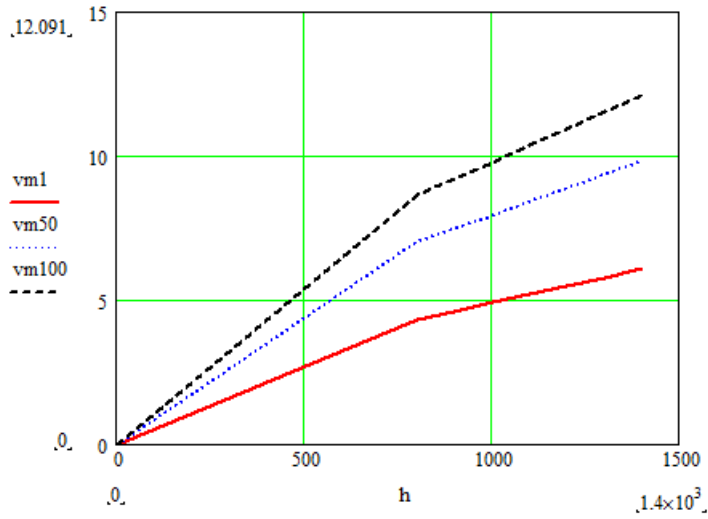
$$vm100_j := vm1_j \cdot \left(\frac{100}{10}\right)^\alpha$$

vm50<sub>j</sub> =

|       |
|-------|
| 7.001 |
| 7.471 |
| 7.941 |
| 8.411 |
| 8.881 |
| 9.351 |
| 9.821 |

vm100<sub>j</sub> =

|        |
|--------|
| 8.62   |
| 9.198  |
| 9.777  |
| 10.355 |
| 10.934 |
| 11.513 |
| 12.091 |





## Rezultatele din fisierele WEIBCS1...WEIBCS8

 $i := 1..20$      $v_i := i$ 

## CARAS SEVERIN

FF50\_1<sub>i</sub> :=

|      |
|------|
| 501  |
| 768  |
| 1117 |
| 1142 |
| 1063 |
| 908  |
| 712  |
| 514  |
| 342  |
| 209  |
| 117  |
| 60   |
| 29   |
| 12   |
| 5    |
| 2    |
| 1    |
| 0    |
| 0    |

FF50\_2<sub>i</sub> :=

|      |
|------|
| 342  |
| 549  |
| 750  |
| 915  |
| 1016 |
| 1039 |
| 982  |
| 861  |
| 699  |
| 526  |
| 367  |
| 236  |
| 140  |
| 76   |
| 38   |
| 18   |
| 7    |
| 3    |
| 1    |
| 0    |

FF100\_1<sub>i</sub> :=

|     |
|-----|
| 276 |
| 452 |
| 636 |
| 802 |
| 926 |
| 988 |
| 981 |
| 906 |
| 779 |
| 624 |
| 464 |
| 320 |
| 204 |
| 120 |
| 65  |
| 32  |
| 15  |
| 6   |
| 2   |
| 1   |

FF100\_2<sub>i</sub> :=

|     |
|-----|
| 201 |
| 334 |
| 484 |
| 635 |
| 769 |
| 869 |
| 919 |
| 912 |
| 850 |
| 744 |
| 609 |
| 466 |
| 333 |
| 221 |
| 136 |
| 77  |
| 40  |
| 19  |
| 9   |
| 3   |

FF50\_3<sub>i</sub> :=

|     |
|-----|
| 256 |
| 420 |
| 594 |
| 757 |
| 885 |
| 959 |
| 968 |
| 912 |
| 802 |
| 658 |
| 503 |
| 357 |
| 235 |
| 144 |
| 81  |
| 42  |
| 20  |
| 9   |
| 3   |
| 1   |

FF50\_4<sub>i</sub> :=

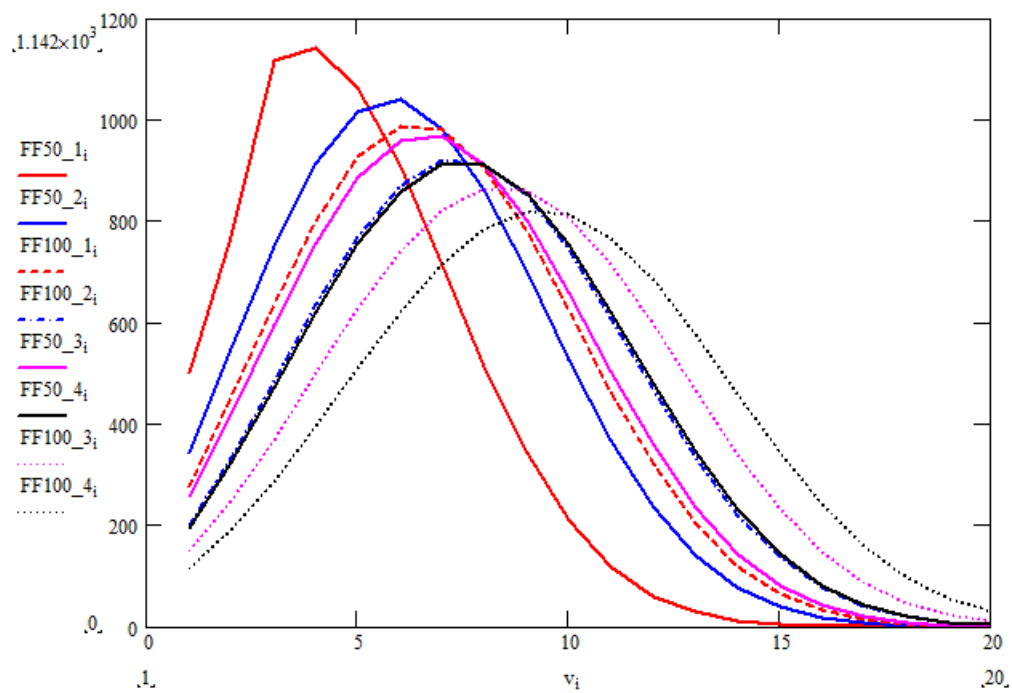
|     |
|-----|
| 195 |
| 324 |
| 471 |
| 621 |
| 756 |
| 858 |
| 913 |
| 912 |
| 855 |
| 753 |
| 621 |
| 479 |
| 345 |
| 231 |
| 143 |
| 82  |
| 43  |
| 21  |
| 9   |
| 4   |

FF100\_3<sub>i</sub> :=

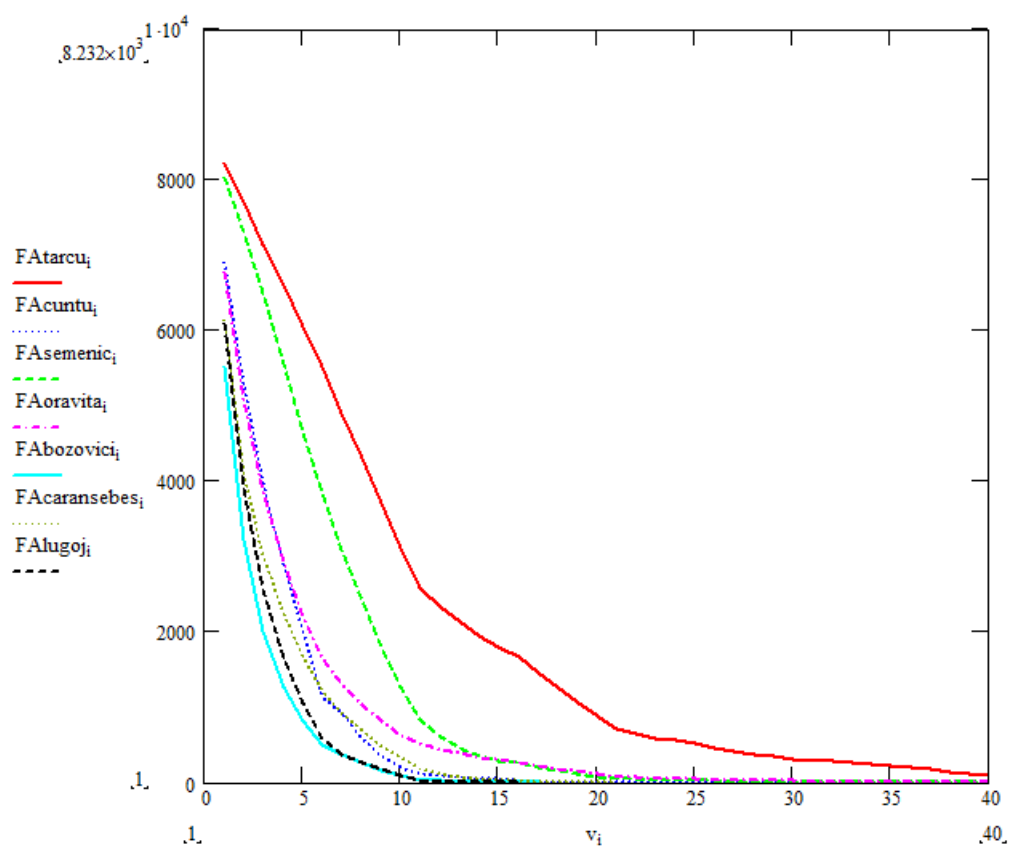
|     |
|-----|
| 149 |
| 249 |
| 369 |
| 499 |
| 628 |
| 740 |
| 824 |
| 865 |
| 860 |
| 807 |
| 714 |
| 595 |
| 465 |
| 340 |
| 233 |
| 148 |
| 87  |
| 47  |
| 24  |
| 11  |

FF100\_4<sub>i</sub> :=

|     |
|-----|
| 114 |
| 191 |
| 286 |
| 395 |
| 509 |
| 620 |
| 715 |
| 785 |
| 819 |
| 812 |
| 765 |
| 683 |
| 577 |
| 460 |
| 344 |
| 242 |
| 158 |
| 97  |
| 55  |
| 29  |







### 3. PROGRAME ȘI REZULTATE LA CAPITOLUL 7

#### 3.1. Calcule pentru Capitolul 7

Pentru graficul 7.1

$$i := 1..4 \quad u := 30$$

$$v_i :=$$

|    |
|----|
| 6  |
| 8  |
| 10 |
| 12 |

$$D_i := \sqrt{\frac{8 \cdot 3500}{0.426 \cdot 1.125 \cdot \pi \cdot (v_i)^3}}$$

$$n_i := \frac{60 \cdot u}{\pi \cdot D_i}$$

$$vm_i := \frac{v_i}{2}$$

$$\lambda \cdot \sigma_i := \frac{u}{vm_i}$$

$$D_i =$$

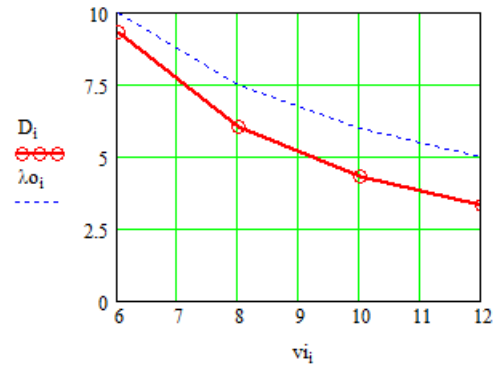
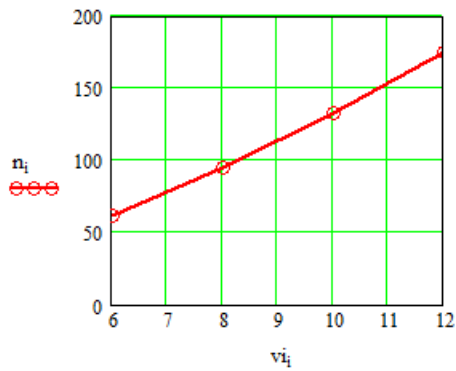
|       |
|-------|
| 9.279 |
| 6.027 |
| 4.312 |
| 3.281 |

$$n_i =$$

|         |
|---------|
| 61.749  |
| 95.068  |
| 132.862 |
| 174.651 |

$$\lambda \sigma_i =$$

|     |
|-----|
| 10  |
| 7.5 |
| 6   |
| 5   |



sau

$i := 1..4$        $u := 30$

$v_{i_j} :=$

|    |
|----|
| 6  |
| 8  |
| 10 |
| 12 |

$$D_i := \sqrt{\frac{8 \cdot 3500}{0.426 \cdot 1.125 \cdot \pi \cdot (v_{i_j})^3}}$$

$$n_i := \frac{60 \cdot u}{\pi \cdot D_i}$$

$$v_{m_i} := \frac{v_{i_j}}{2}$$

$$\lambda \cdot \omega_i := \frac{u}{v_{i_j}}$$

$D_i =$

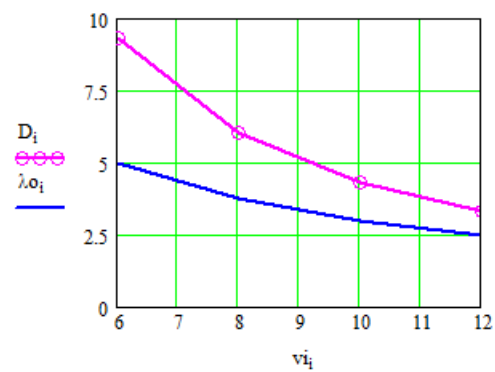
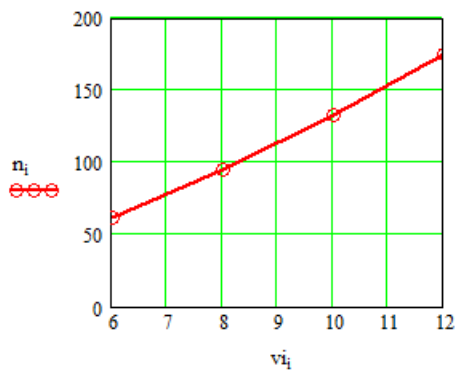
|       |
|-------|
| 9.279 |
| 6.027 |
| 4.312 |
| 3.281 |

$n_i =$

|         |
|---------|
| 61.749  |
| 95.068  |
| 132.862 |
| 174.651 |

$\lambda \cdot \omega_i =$

|      |
|------|
| 5    |
| 3.75 |
| 3    |
| 2.5  |



$i := 1..4$        $u := 40$

$v_{i_j} :=$

|    |
|----|
| 6  |
| 8  |
| 10 |
| 12 |

$$D_i := \sqrt{\frac{8 \cdot 3500}{0.426 \cdot 1.125 \cdot \pi \cdot (v_{i_j})^3}}$$

$$n_i := \frac{60 \cdot u}{\pi \cdot D_i}$$

$$v_{m_i} := \frac{v_{i_j}}{2}$$

$$\lambda \cdot \omega_i := \frac{u}{v_{m_i}}$$

$D_i =$

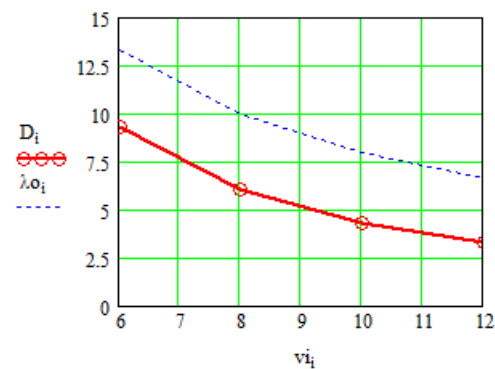
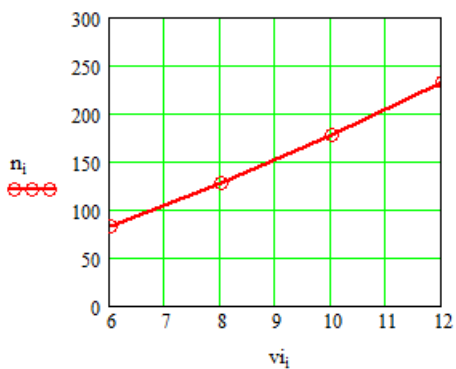
|       |
|-------|
| 9.279 |
| 6.027 |
| 4.312 |
| 3.281 |

$n_i =$

|         |
|---------|
| 82.331  |
| 126.757 |
| 177.149 |
| 232.868 |

$\lambda \cdot \omega_i =$

|        |
|--------|
| 13.333 |
| 10     |
| 8      |
| 6.667  |



sau

$i := 1..4$        $u := 40$

$v_{i_j} :=$

|    |
|----|
| 6  |
| 8  |
| 10 |
| 12 |

$$D_i := \sqrt{\frac{8 \cdot 3500}{0.426 \cdot 1.125 \cdot \pi \cdot (v_{i_j})^3}}$$

$$n_i := \frac{60 \cdot u}{\pi \cdot D_i}$$

$$v_{m_i} := \frac{v_{i_j}}{2}$$

$$\lambda \cdot \omega_i := \frac{u}{v_{i_j}}$$

$D_i =$

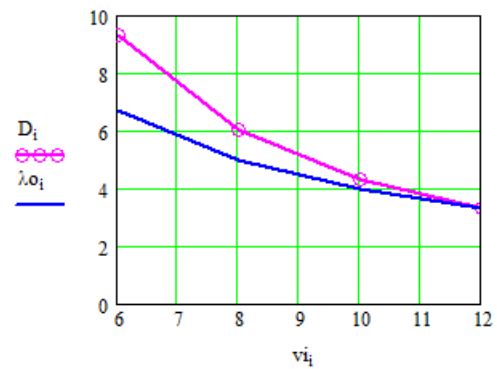
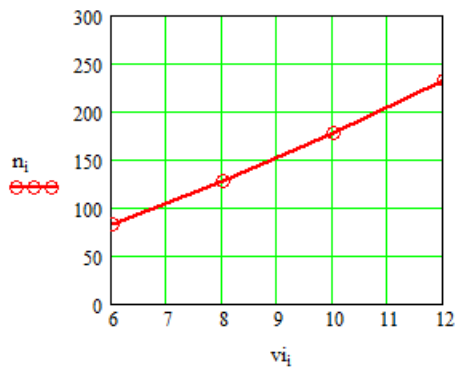
|       |
|-------|
| 9.279 |
| 6.027 |
| 4.312 |
| 3.281 |

$n_i =$

|         |
|---------|
| 82.331  |
| 126.757 |
| 177.149 |
| 232.868 |

$\lambda \cdot \omega_i =$

|       |
|-------|
| 6.667 |
| 5     |
| 4     |
| 3.333 |



Pentru graficul 7.3

$D1 := 3$        $j := 1..15$        $C_p := 0.426$        $Parb := 3500$        $\rho := 1.225$

$D2 := 4$        $v_j := j$

$D3 := 5$

$D4 := 6.5$

$D5 := 8.5$

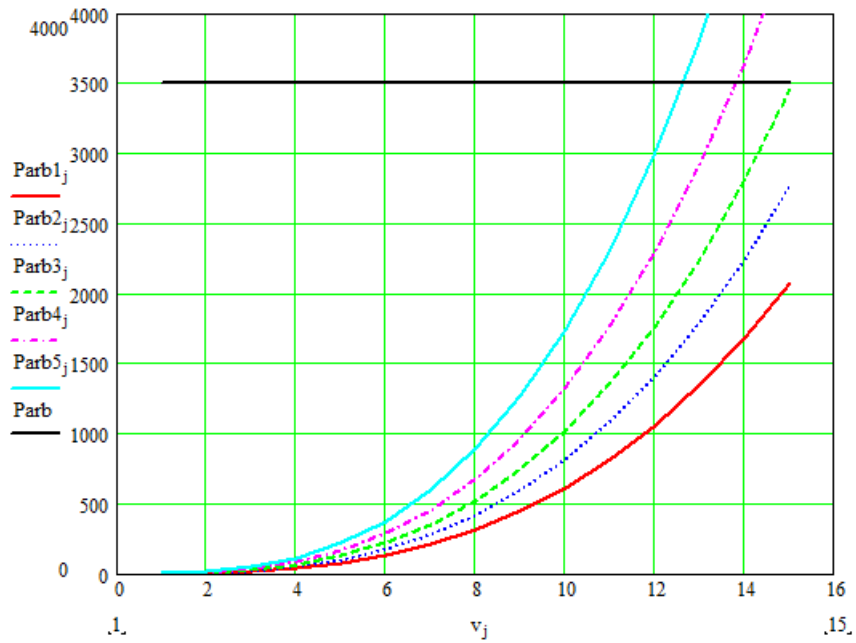
$$Parb1_j := C_p \cdot \frac{\rho \cdot (v_j)^3}{2} \cdot \frac{\pi \cdot D1}{4}$$

$$Parb2_j := C_p \cdot \frac{\rho \cdot (v_j)^3}{2} \cdot \frac{\pi \cdot D2}{4}$$

$$Parb3_j := C_p \cdot \frac{\rho \cdot (v_j)^3}{2} \cdot \frac{\pi \cdot D3}{4}$$

$$Parb4_j := C_p \cdot \frac{\rho \cdot (v_j)^3}{2} \cdot \frac{\pi \cdot D4}{4}$$

$$Parb5_j := C_p \cdot \frac{\rho \cdot (v_j)^3}{2} \cdot \frac{\pi \cdot D5}{4}$$



Pentru graficul 7.5

$$i := 1..12 \quad v_i := i \quad C_p := 0.426 \quad \text{Parb} := 3500$$

$$\rho_1 := 1.1 \quad \rho_2 := 1.225 \quad \rho_3 := 1.5$$

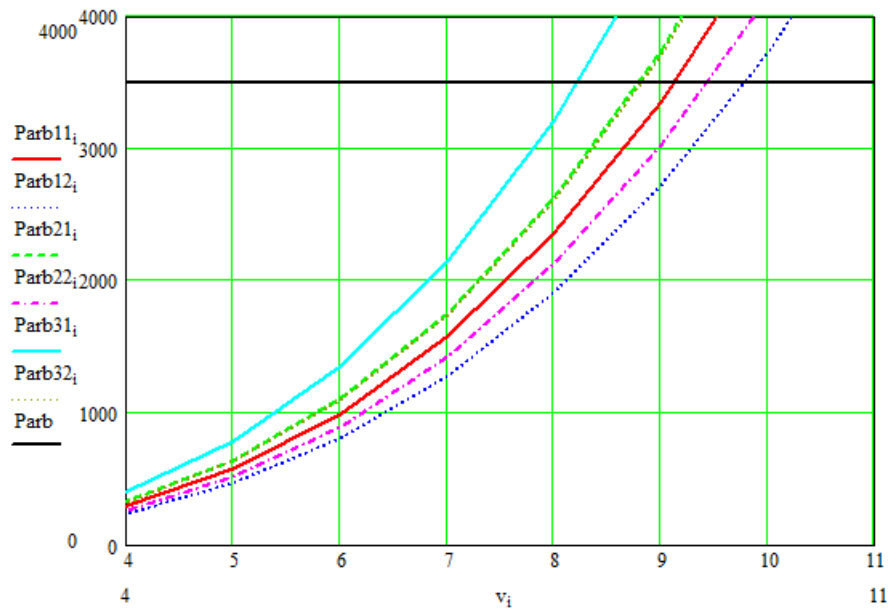
$$D_1 := 5 \quad D_2 := 4.5$$

$$\text{Parb11}_i := C_p \cdot \rho_1 \cdot \frac{(v_i)^3}{2} \cdot \frac{\pi \cdot D_1^2}{4} \quad \text{Parb12}_i := C_p \cdot \rho_1 \cdot \frac{(v_i)^3}{2} \cdot \frac{\pi \cdot D_2^2}{4}$$

$$\text{Parb21}_i := C_p \cdot \rho_2 \cdot \frac{(v_i)^3}{2} \cdot \frac{\pi \cdot D_1^2}{4} \quad \text{Parb22}_i := C_p \cdot \rho_2 \cdot \frac{(v_i)^3}{2} \cdot \frac{\pi \cdot D_2^2}{4}$$

$$\text{Parb31}_i := C_p \cdot \rho_3 \cdot \frac{(v_i)^3}{2} \cdot \frac{\pi \cdot D_1^2}{4} \quad \text{Parb32}_i := C_p \cdot \rho_3 \cdot \frac{(v_i)^3}{2} \cdot \frac{\pi \cdot D_2^2}{4}$$





Pentru tabelul 7.6

1.

$$\text{Parb} := 3500$$

$$\rho := 1.225$$

$$\lambda_o := 3$$

$$D := 4.5$$

$$S := \frac{\pi \cdot D^2}{4}$$

$$S = 15.904$$

$$\text{CParb} := 0.0222 \cdot \lambda_o + 0.0986 \cdot \lambda_o^2 - 0.0113 \cdot \lambda_o^{3.5}$$

$$\text{CParb} = 0.426$$

$$v := \sqrt[3]{\frac{2 \cdot \text{Parb}}{\text{CParb} \cdot \rho \cdot S}}$$

$$v = 9.451$$

$$u_T := v \cdot \lambda_o$$

$$u_T = 28.354$$

$$n := \frac{60 \cdot v \cdot \lambda_o}{\pi \cdot D}$$

$$n = 120.34$$

2.

$$\text{Parb} := 3500$$

$$\rho := 1.225$$

$$\lambda_o := 3$$

$$D := 5$$

$$S := \frac{\pi \cdot D^2}{4}$$

$$S = 19.635$$

$$\text{CParb} := 0.0222 \cdot \lambda_o + 0.0986 \cdot \lambda_o^2 - 0.0113 \cdot \lambda_o^{3.5}$$

$$\text{CParb} = 0.426$$

$$v := \sqrt[3]{\frac{2 \cdot \text{Parb}}{\text{CParb} \cdot \rho \cdot S}}$$

$$v = 8.81$$

$$u_T := v \cdot \lambda_o$$

$$u_T = 26.431$$

$$n := \frac{60 \cdot v \cdot \lambda_o}{\pi \cdot D}$$

$$n = 100.959$$

3.

$$\text{Parb} := 3500$$

$$\rho := 1.225$$

$$\lambda_o := 4$$

$$D := 4.5$$

$$S := \frac{\pi \cdot D^2}{4}$$

$$S = 15.904$$

$$\text{CParb} := 0.0125 \cdot \lambda_o + 0.0626 \cdot \lambda_o^2 - 0.0046 \cdot \lambda_o^{3.5}$$

$$\text{CParb} = 0.463$$

$$v := \sqrt[3]{\frac{2 \cdot \text{Parb}}{\text{CParb} \cdot \rho \cdot S}}$$

$$v = 9.191$$

$$u_T := v \cdot \lambda_o$$

$$u_T = 36.763$$

$$n := \frac{60 \cdot v \cdot \lambda_o}{\pi \cdot D}$$

$$n = 156.027$$

4.

$$\text{Parb} := 3500$$

$$\rho := 1.225$$

$$\lambda_o := 4$$

$$D := 5$$

$$S := \frac{\pi \cdot D^2}{4} \qquad S = 19.635$$

$$\text{CParb} := 0.0125 \cdot \lambda_o + 0.0626 \cdot \lambda_o^2 - 0.0046 \cdot \lambda_o^{3.5} \qquad \text{CParb} = 0.463$$

$$v := \sqrt[3]{\frac{2 \cdot \text{Parb}}{\text{CParb} \cdot \rho \cdot S}} \qquad v = 8.567$$

$$u_T := v \cdot \lambda_o \qquad u_T = 34.269$$

$$n := \frac{60 \cdot v \cdot \lambda_o}{\pi \cdot D} \qquad n = 130.899$$

## 3.2. Programul MODELNOU

### 3.2.1. Programul MODELNOU.BAS

```
CLEAR
CLS
PRINT "program pentru optimizarea turbinei "
PRINT "parametrii utilizati :i;R;Lambr;kv3a;kvTa;kt; kdps;CM;CF;CP;CP1"
PRINT "Introduceti optiuni pentru kv3a si Lambr "
INPUT "kv3a=? "; kv3a
INPUT "Lambr=? "; Lambr
DIM R(11)
DIM kvTa(11)
DIM kt(11)
DIM kdps(11)
DIM CM(11)
DIM CP(11)
DIM CP1(11)
DIM CF(11)
DIM CP2(11)
10 FOR i = 1 TO 11
20 LET R = (i - 1) / 10
30 LET kvTa = (1 + kv3a) / 2
40 LET kt = (R - 1) + SQR((1 - R) * (1 - R) + (1 - kv3a * kv3a) / (Lambr * Lambr))
50 LET CM = 2 * kvTa * kt * Lambr
60 LET kdps = 2 * R * kt * Lambr * Lambr
70 LET CP = CM * Lambr
80 LET CF = CP / kvTa
90 LET CP1 = kvTa * (1 - kv3a * kv3a - (Lambr * Lambr * kt * kt) + kdps)
95 LET CP2 = CF * kvTa
100 LET R(i) = R
101 LET kvTa(i) = kvTa
102 LET kt(i) = kt
103 LET CM(i) = CM
104 LET kdps(i) = kdps
105 LET CP(i) = CP
106 LET CP1(i) = CP1
107 LET CF(i) = CF
108 LET CP2(i) = CP2
110 NEXT i
INPUT "enter filename n$=REACT"; n$
PRINT "n$="; n$
OPEN n$ FOR OUTPUT AS #1
PRINT #1, "REZULTATE PENTRU COEFICIENTI ADIMENSIONALI"
120 CLS
130 PRINT #1, " REZULTATE PENTRU kv3a = "; kv3a; " si Lambr= "; Lambr
140 PRINT #1, " R kvTa kt kdps CM CF
CP CP1 CP2 "
150 FOR i = 1 TO 11
160 PRINT #1, USING "##.## .#### #.#### #.#### #.#### #.###
#.#### #.#### #.#### "; R(i); kvTa(i); kt(i); kdps(i); CM(i); CF(i); CP(i);
CP1(i); CP2(i):
170 NEXT i
CLOSE
180 END
```

### 3.2.2. Cazurile analizate

Rezultatele analizelor coeficienților adimensionali (kt, kdps, CM, CP) în funcție de  $\text{Lambr}=3$  și 4, de  $\text{kv3a}$  (0,8; 0,7; 0,6; 0,5; 0,33) și de Gradul de reacție  $\text{Gr}(0-1,0)$  obținute cu programul MODELNOU.BAS sunt salvate în fișierele React1...React10.

| Numele fișierului REACT | 1   | 2   | 3   | 4   | 5     | 6     | 7   | 8   | 9   | 10  |
|-------------------------|-----|-----|-----|-----|-------|-------|-----|-----|-----|-----|
| $\text{kv3a}$           | 0,8 | 0,7 | 0,8 | 0,7 | 0,333 | 0,333 | 0,5 | 0,5 | 0,6 | 0,6 |
| $\text{Lambr}$          | 3   | 3   | 4   | 4   | 3     | 4     | 3   | 4   | 3   | 4   |

### 3.2.3. Rezultate ale programului MODELNOU.BAS

#### Rezultatele din fișierul React1

REZULTATE PENTRU COEFICIENTI ADIMENSIONALI

REZULTATE PENTRU  $\text{kv3a} = .8$  si  $\text{Lambr} = 3$

| R    | kvTa  | kt     | kdps    | CM     | CF    | CP     | CP1    | CP2    |
|------|-------|--------|---------|--------|-------|--------|--------|--------|
| 0.00 | .9000 | 0.0198 | 0.00000 | 0.1069 | 0.356 | 0.3208 | 0.3208 | 0.3208 |
| 0.10 | .9000 | 0.0220 | 0.03952 | 0.1186 | 0.395 | 0.3557 | 0.3557 | 0.3557 |
| 0.20 | .9000 | 0.0246 | 0.08864 | 0.1330 | 0.443 | 0.3989 | 0.3989 | 0.3989 |
| 0.30 | .9000 | 0.0280 | 0.15126 | 0.1513 | 0.504 | 0.4538 | 0.4538 | 0.4538 |
| 0.40 | .9000 | 0.0325 | 0.23368 | 0.1753 | 0.584 | 0.5258 | 0.5258 | 0.5258 |
| 0.50 | .9000 | 0.0385 | 0.34665 | 0.2080 | 0.693 | 0.6240 | 0.6240 | 0.6240 |
| 0.60 | .9000 | 0.0472 | 0.50991 | 0.2550 | 0.850 | 0.7649 | 0.7649 | 0.7649 |
| 0.70 | .9000 | 0.0606 | 0.76299 | 0.3270 | 1.090 | 0.9810 | 0.9810 | 0.9810 |
| 0.80 | .9000 | 0.0828 | 1.19294 | 0.4474 | 1.491 | 1.3421 | 1.3421 | 1.3421 |
| 0.90 | .9000 | 0.1236 | 2.00243 | 0.6675 | 2.225 | 2.0024 | 2.0024 | 2.0024 |
| 1.00 | .9000 | 0.2000 | 3.60000 | 1.0800 | 3.600 | 3.2400 | 3.2400 | 3.2400 |

#### Rezultatele din fișierul React2

REZULTATE PENTRU COEFICIENTI ADIMENSIONALI

REZULTATE PENTRU  $\text{kv3a} = .7$  si  $\text{Lambr} = 3$

| R    | kvTa  | kt     | kdps    | CM     | CF    | CP     | CP1    | CP2    |
|------|-------|--------|---------|--------|-------|--------|--------|--------|
| 0.00 | .8500 | 0.0279 | 0.00000 | 0.1425 | 0.503 | 0.4275 | 0.4275 | 0.4275 |
| 0.10 | .8500 | 0.0309 | 0.05571 | 0.1578 | 0.557 | 0.4735 | 0.4735 | 0.4735 |
| 0.20 | .8500 | 0.0347 | 0.12480 | 0.1768 | 0.624 | 0.5304 | 0.5304 | 0.5304 |
| 0.30 | .8500 | 0.0394 | 0.21259 | 0.2008 | 0.709 | 0.6023 | 0.6023 | 0.6023 |
| 0.40 | .8500 | 0.0455 | 0.32758 | 0.2320 | 0.819 | 0.6961 | 0.6961 | 0.6961 |
| 0.50 | .8500 | 0.0538 | 0.48397 | 0.2743 | 0.968 | 0.8228 | 0.8228 | 0.8228 |
| 0.60 | .8500 | 0.0655 | 0.70713 | 0.3339 | 1.179 | 1.0018 | 1.0018 | 1.0018 |
| 0.70 | .8500 | 0.0830 | 1.04543 | 0.4232 | 1.493 | 1.2695 | 1.2695 | 1.2695 |
| 0.80 | .8500 | 0.1109 | 1.59714 | 0.5657 | 1.996 | 1.6970 | 1.6970 | 1.6970 |
| 0.90 | .8500 | 0.1582 | 2.56282 | 0.8068 | 2.848 | 2.4204 | 2.4204 | 2.4204 |
| 1.00 | .8500 | 0.2380 | 4.28486 | 1.2140 | 4.285 | 3.6421 | 3.6421 | 3.6421 |

#### Rezultatele din fișierul React3

REZULTATE PENTRU COEFICIENTI ADIMENSIONALI

REZULTATE PENTRU  $\text{kv3a} = .8$  si  $\text{Lambr} = 4$

| R    | kvTa  | kt     | kdps    | CM     | CF    | CP     | CP1    | CP2    |
|------|-------|--------|---------|--------|-------|--------|--------|--------|
| 0.00 | .9000 | 0.0112 | 0.00000 | 0.0805 | 0.358 | 0.3222 | 0.3222 | 0.3222 |
| 0.10 | .9000 | 0.0124 | 0.03973 | 0.0894 | 0.397 | 0.3575 | 0.3575 | 0.3575 |
| 0.20 | .9000 | 0.0139 | 0.08922 | 0.1004 | 0.446 | 0.4015 | 0.4015 | 0.4015 |
| 0.30 | .9000 | 0.0159 | 0.15255 | 0.1144 | 0.509 | 0.4577 | 0.4577 | 0.4577 |

|      |       |        |         |        |       |        |        |        |
|------|-------|--------|---------|--------|-------|--------|--------|--------|
| 0.40 | .9000 | 0.0185 | 0.23636 | 0.1330 | 0.591 | 0.5318 | 0.5318 | 0.5318 |
| 0.50 | .9000 | 0.0220 | 0.35225 | 0.1585 | 0.704 | 0.6340 | 0.6340 | 0.6340 |
| 0.60 | .9000 | 0.0272 | 0.52224 | 0.1958 | 0.870 | 0.7834 | 0.7834 | 0.7834 |
| 0.70 | .9000 | 0.0354 | 0.79319 | 0.2550 | 1.133 | 1.0198 | 1.0198 | 1.0198 |
| 0.80 | .9000 | 0.0500 | 1.28000 | 0.3600 | 1.600 | 1.4400 | 1.4400 | 1.4400 |
| 0.90 | .9000 | 0.0803 | 2.31199 | 0.5780 | 2.569 | 2.3120 | 2.3120 | 2.3120 |
| 1.00 | .9000 | 0.1500 | 4.80000 | 1.0800 | 4.800 | 4.3200 | 4.3200 | 4.3200 |

#### Rezultatele din fișierul React4

REZULTATE PENTRU COEFICIENTI ADIMENSIONALI

| REZULTATE PENTRU kv3a = .7 si Lambr= 4 |       |        |         |        |       |        |        |        |
|--|-------|--------|---------|--------|-------|--------|--------|--------|
| R                                      | kvTa  | kt     | kdps    | CM     | CF    | CP     | CP1    | CP2    |
| 0.00                                   | .8500 | 0.0158 | 0.00000 | 0.1075 | 0.506 | 0.4301 | 0.4301 | 0.4301 |
| 0.10                                   | .8500 | 0.0175 | 0.05612 | 0.1193 | 0.561 | 0.4770 | 0.4770 | 0.4770 |
| 0.20                                   | .8500 | 0.0197 | 0.12595 | 0.1338 | 0.630 | 0.5353 | 0.5353 | 0.5353 |
| 0.30                                   | .8500 | 0.0224 | 0.21513 | 0.1524 | 0.717 | 0.6095 | 0.6095 | 0.6095 |
| 0.40                                   | .8500 | 0.0260 | 0.33279 | 0.1768 | 0.832 | 0.7072 | 0.7072 | 0.7072 |
| 0.50                                   | .8500 | 0.0309 | 0.49470 | 0.2102 | 0.989 | 0.8410 | 0.8410 | 0.8410 |
| 0.60                                   | .8500 | 0.0380 | 0.73028 | 0.2586 | 1.217 | 1.0346 | 1.0346 | 1.0346 |
| 0.70                                   | .8500 | 0.0491 | 1.09997 | 0.3339 | 1.571 | 1.3357 | 1.3357 | 1.3357 |
| 0.80                                   | .8500 | 0.0681 | 1.74324 | 0.4630 | 2.179 | 1.8522 | 1.8522 | 1.8522 |
| 0.90                                   | .8500 | 0.1046 | 3.01345 | 0.7115 | 3.348 | 2.8460 | 2.8460 | 2.8460 |
| 1.00                                   | .8500 | 0.1785 | 5.71314 | 1.2140 | 5.713 | 4.8562 | 4.8562 | 4.8562 |

#### Rezultatele din fișierul React5

REZULTATE PENTRU COEFICIENTI ADIMENSIONALI

| REZULTATE PENTRU kv3a = .33333 si Lambr= 3 |       |        |         |        |       |        |        |        |
|--|-------|--------|---------|--------|-------|--------|--------|--------|
| R  | kvTa  | kt     | kdps    | CM     | CF    | CP     | CP1    | CP2    |
| 0.00                                       | .6667 | 0.0482 | 0.00000 | 0.1929 | 0.868 | 0.5786 | 0.5786 | 0.5786 |
| 0.10                                       | .6667 | 0.0533 | 0.09593 | 0.2132 | 0.959 | 0.6395 | 0.6395 | 0.6395 |
| 0.20                                       | .6667 | 0.0595 | 0.21425 | 0.2381 | 1.071 | 0.7142 | 0.7142 | 0.7142 |
| 0.30                                       | .6667 | 0.0673 | 0.36348 | 0.2692 | 1.212 | 0.8077 | 0.8077 | 0.8077 |
| 0.40                                       | .6667 | 0.0773 | 0.55672 | 0.3093 | 1.392 | 0.9279 | 0.9279 | 0.9279 |
| 0.50                                       | .6667 | 0.0906 | 0.81507 | 0.3623 | 1.630 | 1.0868 | 1.0868 | 1.0868 |
| 0.60                                       | .6667 | 0.1087 | 1.17385 | 0.4348 | 1.956 | 1.3043 | 1.3043 | 1.3043 |
| 0.70                                       | .6667 | 0.1345 | 1.69434 | 0.5379 | 2.420 | 1.6137 | 1.6137 | 1.6137 |
| 0.80                                       | .6667 | 0.1725 | 2.48418 | 0.6900 | 3.105 | 2.0701 | 2.0701 | 2.0701 |
| 0.90                                       | .6667 | 0.2298 | 3.72270 | 0.9192 | 4.136 | 2.7576 | 2.7576 | 2.7576 |
| 1.00                                       | .6667 | 0.3143 | 5.65686 | 1.2571 | 5.657 | 3.7712 | 3.7712 | 3.7712 |

#### Rezultatele din fișierul React6

REZULTATE PENTRU COEFICIENTI ADIMENSIONALI

| REZULTATE PENTRU kv3a = .33333 si Lambr= 4 |       |        |         |        |       |        |        |        |
|--|-------|--------|---------|--------|-------|--------|--------|--------|
| R  | kvTa  | kt     | kdps    | CM     | CF    | CP     | CP1    | CP2    |
| 0.00                                       | .6667 | 0.0274 | 0.00000 | 0.1461 | 0.877 | 0.5846 | 0.5846 | 0.5846 |
| 0.10                                       | .6667 | 0.0304 | 0.09713 | 0.1619 | 0.971 | 0.6475 | 0.6475 | 0.6475 |
| 0.20                                       | .6667 | 0.0340 | 0.21760 | 0.1813 | 1.088 | 0.7253 | 0.7253 | 0.7253 |
| 0.30                                       | .6667 | 0.0386 | 0.37073 | 0.2060 | 1.236 | 0.8238 | 0.8238 | 0.8238 |
| 0.40                                       | .6667 | 0.0446 | 0.57134 | 0.2381 | 1.428 | 0.9522 | 0.9522 | 0.9522 |
| 0.50                                       | .6667 | 0.0528 | 0.84433 | 0.2814 | 1.689 | 1.1258 | 1.1258 | 1.1258 |
| 0.60                                       | .6667 | 0.0643 | 1.23417 | 0.3428 | 2.057 | 1.3713 | 1.3713 | 1.3713 |
| 0.70                                       | .6667 | 0.0815 | 1.82599 | 0.4348 | 2.609 | 1.7390 | 1.7390 | 1.7390 |
| 0.80                                       | .6667 | 0.1091 | 2.79349 | 0.5820 | 3.492 | 2.3279 | 2.3279 | 2.3279 |
| 0.90                                       | .6667 | 0.1560 | 4.49391 | 0.8322 | 4.993 | 3.3288 | 3.3288 | 3.3288 |
| 1.00                                       | .6667 | 0.2357 | 7.54248 | 1.2571 | 7.542 | 5.0283 | 5.0283 | 5.0283 |

#### Rezultatele din fișierul React7

REZULTATE PENTRU COEFICIENTI ADIMENSIONALI

| REZULTATE PENTRU kv3a = .5 si Lambr= 3 |      |    |      |    |    |    |     |     |
|--|------|----|------|----|----|----|-----|-----|
| R                                      | kvTa | kt | kdps | CM | CF | CP | CP1 | CP2 |

|      |       |        |         |        |       |        |        |        |
|------|-------|--------|---------|--------|-------|--------|--------|--------|
| 0.00 | .7500 | 0.0408 | 0.00000 | 0.1837 | 0.735 | 0.5512 | 0.5512 | 0.5512 |
| 0.10 | .7500 | 0.0452 | 0.08129 | 0.2032 | 0.813 | 0.6097 | 0.6097 | 0.6097 |
| 0.20 | .7500 | 0.0505 | 0.18176 | 0.2272 | 0.909 | 0.6816 | 0.6816 | 0.6816 |
| 0.30 | .7500 | 0.0572 | 0.30881 | 0.2573 | 1.029 | 0.7720 | 0.7720 | 0.7720 |
| 0.40 | .7500 | 0.0658 | 0.47400 | 0.2962 | 1.185 | 0.8887 | 0.8887 | 0.8887 |
| 0.50 | .7500 | 0.0774 | 0.69615 | 0.3481 | 1.392 | 1.0442 | 1.0442 | 1.0442 |
| 0.60 | .7500 | 0.0933 | 1.00751 | 0.4198 | 1.679 | 1.2594 | 1.2594 | 1.2594 |
| 0.70 | .7500 | 0.1163 | 1.46580 | 0.5235 | 2.094 | 1.5705 | 1.5705 | 1.5705 |
| 0.80 | .7500 | 0.1512 | 2.17711 | 0.6803 | 2.721 | 2.0410 | 2.0410 | 2.0410 |
| 0.90 | .7500 | 0.2055 | 3.32918 | 0.9248 | 3.699 | 2.7743 | 2.7743 | 2.7743 |
| 1.00 | .7500 | 0.2887 | 5.19615 | 1.2990 | 5.196 | 3.8971 | 3.8971 | 3.8971 |

### Rezultatele din fișierul React8

REZULTATE PENTRU COEFICIENTI ADIMENSIONALI

| REZULTATE PENTRU kv3a = .5 si Lambr= 4 |       |        |         |        |       |        |        |        |
|--|-------|--------|---------|--------|-------|--------|--------|--------|
| R                                      | kvTa  | kt     | kdps    | CM     | CF    | CP     | CP1    | CP2    |
| 0.00                                   | .7500 | 0.0232 | 0.00000 | 0.1390 | 0.741 | 0.5561 | 0.5561 | 0.5561 |
| 0.10                                   | .7500 | 0.0257 | 0.08216 | 0.1541 | 0.822 | 0.6162 | 0.6162 | 0.6162 |
| 0.20                                   | .7500 | 0.0288 | 0.18419 | 0.1727 | 0.921 | 0.6907 | 0.6907 | 0.6907 |
| 0.30                                   | .7500 | 0.0327 | 0.31409 | 0.1963 | 1.047 | 0.7852 | 0.7852 | 0.7852 |
| 0.40                                   | .7500 | 0.0379 | 0.48470 | 0.2272 | 1.212 | 0.9088 | 0.9088 | 0.9088 |
| 0.50                                   | .7500 | 0.0449 | 0.71780 | 0.2692 | 1.436 | 1.0767 | 1.0767 | 1.0767 |
| 0.60                                   | .7500 | 0.0548 | 1.05283 | 0.3290 | 1.755 | 1.3160 | 1.3160 | 1.3160 |
| 0.70                                   | .7500 | 0.0700 | 1.56724 | 0.4198 | 2.239 | 1.6792 | 1.6792 | 1.6792 |
| 0.80                                   | .7500 | 0.0947 | 2.42549 | 0.5685 | 3.032 | 2.2739 | 2.2739 | 2.2739 |
| 0.90                                   | .7500 | 0.1385 | 3.98836 | 0.8309 | 4.432 | 3.3236 | 3.3236 | 3.3236 |
| 1.00                                   | .7500 | 0.2165 | 6.92820 | 1.2990 | 6.928 | 5.1962 | 5.1962 | 5.1962 |

### Rezultatele din fișierul React9

REZULTATE PENTRU COEFICIENTI ADIMENSIONALI

| REZULTATE PENTRU kv3a = .6 si Lambr= 3 |       |        |         |        |       |        |        |        |
|--|-------|--------|---------|--------|-------|--------|--------|--------|
| R                                      | kvTa  | kt     | kdps    | CM     | CF    | CP     | CP1    | CP2    |
| 0.00                                   | .8000 | 0.0349 | 0.00000 | 0.1677 | 0.629 | 0.5032 | 0.5032 | 0.5032 |
| 0.10                                   | .8000 | 0.0387 | 0.06962 | 0.1856 | 0.696 | 0.5569 | 0.5569 | 0.5569 |
| 0.20                                   | .8000 | 0.0433 | 0.15579 | 0.2077 | 0.779 | 0.6231 | 0.6231 | 0.6231 |
| 0.30                                   | .8000 | 0.0491 | 0.26500 | 0.2356 | 0.883 | 0.7067 | 0.7067 | 0.7067 |
| 0.40                                   | .8000 | 0.0566 | 0.40745 | 0.2716 | 1.019 | 0.8149 | 0.8149 | 0.8149 |
| 0.50                                   | .8000 | 0.0667 | 0.60000 | 0.3200 | 1.200 | 0.9600 | 0.9600 | 0.9600 |
| 0.60                                   | .8000 | 0.0807 | 0.87199 | 0.3876 | 1.453 | 1.1627 | 1.1627 | 1.1627 |
| 0.70                                   | .8000 | 0.1014 | 1.27747 | 0.4867 | 1.825 | 1.4600 | 1.4600 | 1.4600 |
| 0.80                                   | .8000 | 0.1333 | 1.92000 | 0.6400 | 2.400 | 1.9200 | 1.9200 | 1.9200 |
| 0.90                                   | .8000 | 0.1848 | 2.99376 | 0.8870 | 3.326 | 2.6611 | 2.6611 | 2.6611 |
| 1.00                                   | .8000 | 0.2667 | 4.80000 | 1.2800 | 4.800 | 3.8400 | 3.8400 | 3.8400 |

### Rezultatele din fișierul React10

REZULTATE PENTRU COEFICIENTI ADIMENSIONALI

| REZULTATE PENTRU kv3a = .6 si Lambr= 4 |       |        |         |        |       |        |        |        |
|--|-------|--------|---------|--------|-------|--------|--------|--------|
| R                                      | kvTa  | kt     | kdps    | CM     | CF    | CP     | CP1    | CP2    |
| 0.00                                   | .8000 | 0.0198 | 0.00000 | 0.1267 | 0.634 | 0.5070 | 0.5070 | 0.5070 |
| 0.10                                   | .8000 | 0.0220 | 0.07025 | 0.1405 | 0.703 | 0.5620 | 0.5620 | 0.5620 |
| 0.20                                   | .8000 | 0.0246 | 0.15758 | 0.1576 | 0.788 | 0.6303 | 0.6303 | 0.6303 |
| 0.30                                   | .8000 | 0.0280 | 0.26891 | 0.1793 | 0.896 | 0.7171 | 0.7171 | 0.7171 |
| 0.40                                   | .8000 | 0.0325 | 0.41543 | 0.2077 | 1.039 | 0.8309 | 0.8309 | 0.8309 |
| 0.50                                   | .8000 | 0.0385 | 0.61626 | 0.2465 | 1.233 | 0.9860 | 0.9860 | 0.9860 |
| 0.60                                   | .8000 | 0.0472 | 0.90650 | 0.3022 | 1.511 | 1.2087 | 1.2087 | 1.2087 |
| 0.70                                   | .8000 | 0.0606 | 1.35643 | 0.3876 | 1.938 | 1.5502 | 1.5502 | 1.5502 |
| 0.80                                   | .8000 | 0.0828 | 2.12077 | 0.5302 | 2.651 | 2.1208 | 2.1208 | 2.1208 |
| 0.90                                   | .8000 | 0.1236 | 3.55988 | 0.7911 | 3.955 | 3.1643 | 3.1643 | 3.1643 |
| 1.00                                   | .8000 | 0.2000 | 6.40000 | 1.2800 | 6.400 | 5.1200 | 5.1200 | 5.1200 |

## Rezultate pentru Tabelele 7.8 ... 7.11

## REZULTATE PENTRU COEFICIENTI ADIMENSIONALI

| REZULTATE PENTRU kv3a = .9 si Lambr= 2 |       |        |         |        |       |        |        |        |
|--|-------|--------|---------|--------|-------|--------|--------|--------|
| R                                      | kvTa  | kt     | kdps    | CM     | CF    | CP     | CP1    | CP2    |
| 0.00                                   | .9500 | 0.0235 | 0.00000 | 0.0892 | 0.188 | 0.1784 | 0.1784 | 0.1784 |
| 0.10                                   | .9500 | 0.0260 | 0.02081 | 0.0988 | 0.208 | 0.1977 | 0.1977 | 0.1977 |
| 0.20                                   | .9500 | 0.0292 | 0.04665 | 0.1108 | 0.233 | 0.2216 | 0.2216 | 0.2216 |
| 0.30                                   | .9500 | 0.0331 | 0.07955 | 0.1259 | 0.265 | 0.2519 | 0.2519 | 0.2519 |
| 0.40                                   | .9500 | 0.0384 | 0.12274 | 0.1458 | 0.307 | 0.2915 | 0.2915 | 0.2915 |
| 0.50                                   | .9500 | 0.0454 | 0.18174 | 0.1727 | 0.363 | 0.3453 | 0.3453 | 0.3453 |
| 0.60                                   | .9500 | 0.0555 | 0.26650 | 0.2110 | 0.444 | 0.4220 | 0.4220 | 0.4220 |
| 0.70                                   | .9500 | 0.0708 | 0.39654 | 0.2691 | 0.566 | 0.5382 | 0.5382 | 0.5382 |
| 0.80                                   | .9500 | 0.0958 | 0.61315 | 0.3641 | 0.766 | 0.7281 | 0.7281 | 0.7281 |
| 0.90                                   | .9500 | 0.1398 | 1.00650 | 0.5312 | 1.118 | 1.0624 | 1.0624 | 1.0624 |
| 1.00                                   | .9500 | 0.2179 | 1.74356 | 0.8282 | 1.744 | 1.6564 | 1.6564 | 1.6564 |

## REZULTATE PENTRU COEFICIENTI ADIMENSIONALI

| REZULTATE PENTRU kv3a = .9 si Lambr= 3 |       |        |         |        |       |        |        |        |
|--|-------|--------|---------|--------|-------|--------|--------|--------|
| R                                      | kvTa  | kt     | kdps    | CM     | CF    | CP     | CP1    | CP2    |
| 0.00                                   | .9500 | 0.0105 | 0.00000 | 0.0599 | 0.189 | 0.1796 | 0.1796 | 0.1796 |
| 0.10                                   | .9500 | 0.0117 | 0.02098 | 0.0664 | 0.210 | 0.1993 | 0.1993 | 0.1993 |
| 0.20                                   | .9500 | 0.0131 | 0.04711 | 0.0746 | 0.236 | 0.2238 | 0.2238 | 0.2238 |
| 0.30                                   | .9500 | 0.0149 | 0.08057 | 0.0850 | 0.269 | 0.2551 | 0.2551 | 0.2551 |
| 0.40                                   | .9500 | 0.0173 | 0.12486 | 0.0988 | 0.312 | 0.2965 | 0.2965 | 0.2965 |
| 0.50                                   | .9500 | 0.0207 | 0.18615 | 0.1179 | 0.372 | 0.3537 | 0.3537 | 0.3537 |
| 0.60                                   | .9500 | 0.0256 | 0.27617 | 0.1458 | 0.460 | 0.4373 | 0.4373 | 0.4373 |
| 0.70                                   | .9500 | 0.0333 | 0.42000 | 0.1900 | 0.600 | 0.5700 | 0.5700 | 0.5700 |
| 0.80                                   | .9500 | 0.0472 | 0.67978 | 0.2691 | 0.850 | 0.8072 | 0.8072 | 0.8072 |
| 0.90                                   | .9500 | 0.0764 | 1.23741 | 0.4354 | 1.375 | 1.3062 | 1.3062 | 1.3062 |
| 1.00                                   | .9500 | 0.1453 | 2.61534 | 0.8282 | 2.615 | 2.4846 | 2.4846 | 2.4846 |

## REZULTATE PENTRU COEFICIENTI ADIMENSIONALI

| REZULTATE PENTRU kv3a = .9 si Lambr= 4 |       |        |         |        |       |        |        |        |
|--|-------|--------|---------|--------|-------|--------|--------|--------|
| R                                      | kvTa  | kt     | kdps    | CM     | CF    | CP     | CP1    | CP2    |
| 0.00                                   | .9500 | 0.0059 | 0.00000 | 0.0450 | 0.189 | 0.1800 | 0.1800 | 0.1800 |
| 0.10                                   | .9500 | 0.0066 | 0.02103 | 0.0500 | 0.210 | 0.1998 | 0.1998 | 0.1998 |
| 0.20                                   | .9500 | 0.0074 | 0.04728 | 0.0561 | 0.236 | 0.2246 | 0.2246 | 0.2246 |
| 0.30                                   | .9500 | 0.0084 | 0.08094 | 0.0641 | 0.270 | 0.2563 | 0.2563 | 0.2563 |
| 0.40                                   | .9500 | 0.0098 | 0.12564 | 0.0746 | 0.314 | 0.2984 | 0.2984 | 0.2984 |
| 0.50                                   | .9500 | 0.0117 | 0.18780 | 0.0892 | 0.376 | 0.3568 | 0.3568 | 0.3568 |
| 0.60                                   | .9500 | 0.0146 | 0.27990 | 0.1108 | 0.466 | 0.4432 | 0.4432 | 0.4432 |
| 0.70                                   | .9500 | 0.0192 | 0.42960 | 0.1458 | 0.614 | 0.5830 | 0.5830 | 0.5830 |
| 0.80                                   | .9500 | 0.0278 | 0.71068 | 0.2110 | 0.888 | 0.8439 | 0.8439 | 0.8439 |
| 0.90                                   | .9500 | 0.0479 | 1.37958 | 0.3641 | 1.533 | 1.4562 | 1.4562 | 1.4562 |
| 1.00                                   | .9500 | 0.1090 | 3.48712 | 0.8282 | 3.487 | 3.3128 | 3.3128 | 3.3128 |

## REZULTATE PENTRU COEFICIENTI ADIMENSIONALI

| REZULTATE PENTRU kv3a = .9 si Lambr= 5 |       |        |         |        |       |        |        |        |
|--|-------|--------|---------|--------|-------|--------|--------|--------|
| R                                      | kvTa  | kt     | kdps    | CM     | CF    | CP     | CP1    | CP2    |
| 0.00                                   | .9500 | 0.0038 | 0.00000 | 0.0360 | 0.190 | 0.1802 | 0.1802 | 0.1802 |
| 0.10                                   | .9500 | 0.0042 | 0.02106 | 0.0400 | 0.211 | 0.2001 | 0.2001 | 0.2001 |
| 0.20                                   | .9500 | 0.0047 | 0.04736 | 0.0450 | 0.237 | 0.2250 | 0.2250 | 0.2250 |
| 0.30                                   | .9500 | 0.0054 | 0.08112 | 0.0514 | 0.270 | 0.2569 | 0.2569 | 0.2569 |
| 0.40                                   | .9500 | 0.0063 | 0.12601 | 0.0599 | 0.315 | 0.2993 | 0.2993 | 0.2993 |
| 0.50                                   | .9500 | 0.0075 | 0.18858 | 0.0717 | 0.377 | 0.3583 | 0.3583 | 0.3583 |
| 0.60                                   | .9500 | 0.0094 | 0.28169 | 0.0892 | 0.469 | 0.4460 | 0.4460 | 0.4460 |
| 0.70                                   | .9500 | 0.0124 | 0.43435 | 0.1179 | 0.620 | 0.5895 | 0.5895 | 0.5895 |
| 0.80                                   | .9500 | 0.0182 | 0.72697 | 0.1727 | 0.909 | 0.8633 | 0.8633 | 0.8633 |
| 0.90                                   | .9500 | 0.0327 | 1.46992 | 0.3103 | 1.633 | 1.5516 | 1.5516 | 1.5516 |
| 1.00                                   | .9500 | 0.0872 | 4.35890 | 0.8282 | 4.359 | 4.1410 | 4.1410 | 4.1410 |



### 3.3. Programul MODNT

#### 3.3.1. Programul MODNT.BAS

```
REM Program de asamblare a modelului nou pentru o turbina in studiu
CLEAR
CLS
PRINT "Date pentru amsablul turbinei D[m],uR[m/s], v1[m/s],RO[kg/m3] "
INPUT "D[m]= ?"; D
INPUT " uR[m/s]=?"; uR
INPUT " v1[m/s]=?"; v1
INPUT "kv3a=?"; kv3a
LET v3a = kv3a * v1
INPUT " RO[kg/m3]=?"; RO
LET kvTa = (1 + kv3a) / 2
LET vTa = kvTa * v1
LET PC = RO * v1 * v1 * v1 / 2 * 3.1415 * D * D / 4
LET dint = .2 * D
LET LambD = uR / v1
INPUT "Nr.sectiuni de calcul"; imax
LET Delr = (D / 2 - dint / 2) / imax
INPUT "Gradul de reactie la raza D/2 GrD=?"; GrD
DIM r(imax)
DIM kt(imax)
DIM Lambr(imax)
DIM Gr(imax)
DIM DelPC(imax)
DIM kdps(imax)
DIM v3a(imax)
DIM Delps(imax)
DIM Dpech(imax)
DIM vt(imax)
DIM Delp(imax)
DIM CM(imax)
DIM CF(imax)
DIM CF1(imax)
DIM CP(imax)
DIM Delf(imax)
DIM Delf1(imax)
5 LET SUMDelp = 0
6 LET SUMDelf = 0
INPUT "enter filename"; n$
PRINT "n$="; n$
OPEN n$ FOR OUTPUT AS #1
PRINT #1, "n$="; n$, "program basic MODNT.BAS"
PRINT "Optiuni pentru repartitia gradele de reactie cu raza"
PRINT "q=1 repartitie constanta, q=2 r liniara, q=3 r. patratica ,q=4
r.hiperbolica,q=5 pentru END"
INPUT "q=?"; q
FOR i = 1 TO imax
LET r(1) = D / 2 - Delr / 2
IF i > 1 THEN r(i) = r(i - 1) - Delr
LET Lambr(i) = LambD * 2 * r(i) / D
LET DelPC(i) = RO * v1 * v1 * v1 * 3.1415 * r(i) * Delr
IF q = 1 THEN GOTO 10
IF q = 2 THEN GOTO 20
IF q = 3 THEN GOTO 30
IF q = 4 THEN GOTO 40
IF q = 5 THEN END
10 LET Gr(i) = GrD
```

```

REM PRINT #1, "repartitie constanta a gradului de reactie cu raza"
11 GOTO 100
20 LET Gr(i) = GrD - .01 * (i - 1)
REM PRINT #1, "repartitie liniara a gradului de reactie cu raza"
21 GOTO 100
30 LET Gr(i) = GrD - .002 * (i - 1) * (i - 1)
REM PRINT #1, "repartitie patratica a gradului de reactie cu raza "
31 GOTO 100
40 LET Gr(i) = GrD / (1 + .01 * (i - 1))
REM PRINT #1, "repartitia hiperbolica a gradului de reactie cu raza"
41 GOTO 100
100 LET kt(i) = (Gr(i) - 1) + SQR((1 - Gr(i)) * (1 - Gr(i)) + (1 - kv3a * kv3a)
/ (Lambr(i) * Lambr(i)))
105 LET vt(i) = kt(i) * uR / D * 2 * r(i)
110 LET kdps(i) = 2 * Gr(i) * kt(i) * Lambr(i) * Lambr(i)
115 LET Delps(i) = kdps(i) * v1 * v1 / 2 * RO
120 LET CM(i) = 2 * kvTa * kt(i) * Lambr(i)
130 LET CP(i) = CM(i) * Lambr(i)
140 LET CF(i) = CP(i) / kvTa
145 LET DelPC(i) = (RO / 2) * v1 * v1 * v1 * 2 * 3.1415 * r(i) * Delr
150 LET DelP(i) = CP(i) * DelPC(i)
155 LET DelF(i) = CF(i) * (RO / 2) * v1 * v1 * 2 * 3.1415 * r(i) * Delr
160 LET SUMDelP = SUMDelP + DelP(i)
170 LET SUMDelF = SUMDelF + DelF(i)
200 NEXT i
210 LET CPT = SUMDelP / PC
250 PRINT #1, "REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE "
260 PRINT #1, "D[m]="; D; ";uR[m/s]="; uR; ";v1[m/s]="; v1; ";RO[kg/m3]="; RO;
";kv3a="; kv3a; ";PC[kW]="; PC / 1000
270 PRINT #1,
"
"
280 PRINT #1, " i      r[m]      Gr      kt      kdps      CF      CP
Lambr "
282 PRINT #1,
"
"
IF q = 1 THEN PRINT #1, "repartitie constanta a gradului de reactie cu raza"
IF q = 2 THEN PRINT #1, "repartitie liniara a gradului de reactie cu raza"
IF q = 3 THEN PRINT #1, "repartitie patratica a gradului de reactie cu raza"
IF q = 4 THEN PRINT #1, "repartitie hiperbolica a gradului de reacxtie cu raza"
290 FOR i = 1 TO imax
300 PRINT #1, USING "### ##.## .#### #.#### #.#### #.####
#.#### ##.## "; i; r(i); Gr(i); kt(i); kdps(i); CF(i); CP(i); Lambr(i)
310 NEXT i
320 PRINT "pentru continuare introduceti x=1 ;pentru oprire x=2"
PRINT "pentru alta varianta pentru Gr x=3"
330 INPUT "x=? "; x
340 IF x = 2 THEN END
IF x = 3 THEN GOTO 5
341 CLS
400 PRINT #1, "REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE"
410 PRINT #1, "D[m]="; D; " uR[m/s]="; uR; " v1[m/s]="; v1; " v3a[m/s]="; v3a;
" Delr="; Delr
420 PRINT #1,
"
"
430 PRINT #1, " i      r[m]      Lambr      vt[m/s]      Delps[Pa]      DelPC[kW]      DelP[kW]
DelF[kN] "
440 PRINT #1,
"
"
441 FOR i = 1 TO imax

```

```
450 PRINT #1, USING "###  ##.##  ##.##  ###.##  ###.###  ###.###
###.###  ##.###"; i; r(i); Lambr(i); vt(i); Delps(i); DelPC(i) / 1000;
DelP(i) / 1000; DelF(i) / 1000
451 NEXT i
460 PRINT #1, "Valori însumate:"; "PC[kW]="; PC / 1000; " SUMDelP[kW]=";
SUMDelP / 1000; " CPT="; CPT
471 PRINT #1, " PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP
este puterea teoretică extrasă ; CPT este coeficientul teoretic global al
TURBINEI "
475 INPUT " CONT o tasta numerica"; q
CLS
480 PRINT "Petru continuare se ofera variante y=1 reluare a coeficientilor"
481 PRINT " y=2 variante pentru Gr"
482 PRINT " y=4 END"
PRINT " y=3 continuare"
483 IF y = 1 THEN GOTO 210
484 IF y = 2 THEN GOTO 5
485 IF y = 4 THEN END
490 CLS
500 LET Dpech(1) = 0
510 FOR i = 2 TO imax
520 LET Dpech(i) = -RO * ((vt(i - 1) * vt(i - 1) / r(i - 1) - vt(i) * vt(i) /
r(i))) * (r(i - 1) - r(i)) + Dpech(i - 1)
525 NEXT i
530 PRINT #1, "COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU
RADIAL"
540 PRINT #1, " i r(i) [m] Delps(i) [Pa]
Dpech(i) [Pa] "
550 FOR i = 1 TO imax
560 PRINT #1, USING " ### ##.### ##.###
###.###"; i; r(i); Delps(i); Dpech(i)
570 NEXT i
600 PRINT "OPȚIUNI O=1 GOTO 5 pentru variante sau O=2 continuare sau O=3 pentru
END"
610 INPUT "O="; o
620 IF o = 1 THEN GOTO 5
621 IF o = 3 THEN END
700 REM Comparatii pentru fortele axiale
701 LET SUMF = 0
LET SUMF1 = 0
710 FOR i = 1 TO imax
720 CF1(i) = 1 - (kv3a * kv3a) + kdps(i)
721 DelF1(i) = CF1(i) * RO * (v1 * v1 / 2) * 2 * 3.1415 * r(i) * Delr
722 LET SUMF1 = SUMF1 + DelF1(i)
730 NEXT i
731 CLS
740 PRINT "COMPARATII PENTRU FORTELE AXIALE (COEFICIENTI Si FORTE) "
750 PRINT " _____ "
760 PRINT " i r(i) CF CF1 DelF [kN] DelF1 [kN]
"
770 PRINT " _____ "
780 FOR i = 1 TO imax
790 PRINT USING "### ##.### #.### #.###
###.### ##.###";
i; r(i); CF(i); CF1(i); DelF(i) / 1000; DelF1(i) / 1000
791 NEXT i
800 PRINT "SUMF [kN]="; SUMDelF / 1000, "SUMF1 [kN]="; SUMF1 / 1000
810 PRINT "OPTIUNI 1 :END; 2 :variante noi"
815 INPUT "q="; q
820 IF q = 2 GOTO 5
CLOSE
900 END
```

### 3.3.2. Cazurile analizate

Rezultatele obținute cu programul MODNT.BAS sunt salvate în fișierele rnoust1...rnoust20. Au fost analizate următoarele cazuri pentru asamblarea coeficienților pentru turbina cu  $D = 4,5$  și  $5,0$  m;  $\text{Lambr} = 3$  și  $4$ ;  $\text{Gr} = 0,8$ ;  $0,6$ ;  $\text{kv3a} = 0,7$  și alți parametrii de interes.

| Nr. crt. | D [m] | Tipul turbinei                             | Repartiția lui $\bar{R}$ cu raza | $\bar{R}$ la D/2 | Numele fișierului cu rezultate |
|----------|-------|--|----------------------------------|------------------|--------------------------------|
| 1        | 4,5   | "Tip A"<br>$u_R=28,8$ m/s<br>$v_i=9,6$ m/s | constanta                        | 0,8              | Rnoust1                        |
| 2        |       |  | constanta                        | 0,6              | Rnoust5                        |
| 3        |       |  | liniara                          | 0,8              | Rnoust9                        |
| 4        |       |  | patratica                        | 0,8              | Rnoust10                       |
| 5        |       |  | hiperbolica                      | 0,8              | Rnoust11                       |
| 6        | 4,5   | "Tip B"<br>$u_R=37,6$ m/s<br>$v_i=9,4$ m/s | constanta                        | 0,8              | Rnoust3                        |
| 7        |       |  | constanta                        | 0,6              | Rnoust6                        |
| 8        |       |  | liniara                          | 0,8              | Rnoust15                       |
| 9        |       |  | patratica                        | 0,8              | Rnoust16                       |
| 10       |       |  | hiperbolica                      | 0,8              | Rnoust17                       |
| 11       | 5     | "Tip A"<br>$u_R=26,7$ m/s<br>$v_i=8,9$ m/s | constanta                        | 0,8              | Rnoust2                        |
| 12       |       |  | constanta                        | 0,6              | Rnoust7                        |
| 13       |       |  | liniara                          | 0,8              | Rnoust12                       |
| 14       |       |  | patratica                        | 0,8              | Rnoust13                       |
| 15       |       |  | hiperbolica                      | 0,8              | Rnoust14                       |
| 16       | 5     | "Tip B"<br>$u_R=34,4$ m/s<br>$v_i=8,6$ m/s | constanta                        | 0,8              | Rnoust4                        |
| 17       |       |  | constanta                        | 0,6              | Rnoust8                        |
| 18       |       |  | liniara                          | 0,8              | Rnoust18                       |
| 19       |       |  | patratica                        | 0,8              | Rnoust19                       |
| 20       |       |  | hiperbolica                      | 0,8              | Rnoust20                       |

### 3.3.3. Rezultate ale programului MODNT.BAS

Influența diferitelor distribuții ale gradului de reacție de-a lungul razei reiese din rezultatele următoare:

#### Rezultatele din fișierul rnoust1

nş=rnoust1 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

**D[m] = 4.5** ;  $u_R$ [m/s] = 28.8 ;  $v_l$ [m/s] = 9.6 ;  $RO$ [kg/m<sup>3</sup>] = 1.225 ;  $kv3a$  = .7 ;  $PC$ [kW] = 8.618307

| i   | r[m] | Gr    | kt     | kdps   | CF     | CP     | Lambr |
|---|------|-------|--------|--------|--------|--------|-------|
| repartitie <b>constanta</b> a gradului de reacție cu raza |      |       |        |        |        |        |       |
| 1   | 2.16 | .8000 | 0.1186 | 1.5736 | 1.9669 | 1.6719 | 2.88  |
| 2   | 1.98 | .8000 | 0.1364 | 1.5212 | 1.9015 | 1.6163 | 2.64  |
| 3   | 1.80 | .8000 | 0.1585 | 1.4610 | 1.8262 | 1.5523 | 2.40  |
| 4   | 1.62 | .8000 | 0.1864 | 1.3915 | 1.7394 | 1.4785 | 2.16  |
| 5   | 1.44 | .8000 | 0.2223 | 1.3112 | 1.6391 | 1.3932 | 1.92  |
| 6   | 1.26 | .8000 | 0.2698 | 1.2183 | 1.5229 | 1.2944 | 1.68  |

|    |      |       |        |        |        |        |      |
|----|------|-------|--------|--------|--------|--------|------|
| 7  | 1.08 | .8000 | 0.3347 | 1.1106 | 1.3882 | 1.1800 | 1.44 |
| 8  | 0.90 | .8000 | 0.4278 | 0.9857 | 1.2321 | 1.0473 | 1.20 |
| 9  | 0.72 | .8000 | 0.5703 | 0.8410 | 1.0512 | 0.8935 | 0.96 |
| 10 | 0.54 | .8000 | 0.8118 | 0.6734 | 0.8417 | 0.7154 | 0.72 |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 4.5 uR[m/s]= 28.8 v1[m/s]= 9.6 v3a[m/s]= 6.72 Delr= .18

| i  | r[m] | Lambr | vt [m/s] | Delps [Pa] | DelPC [kW] | DelP [kW] | DelF [kN] |
|----|------|-------|----------|------------|------------|-----------|-----------|
| 1  | 2.16 | 2.88  | 3.28     | 88.824     | 1.324      | 2.213     | 0.271     |
| 2  | 1.98 | 2.64  | 3.46     | 85.869     | 1.213      | 1.961     | 0.240     |
| 3  | 1.80 | 2.40  | 3.65     | 82.470     | 1.103      | 1.712     | 0.210     |
| 4  | 1.62 | 2.16  | 3.87     | 78.549     | 0.993      | 1.468     | 0.180     |
| 5  | 1.44 | 1.92  | 4.10     | 74.017     | 0.883      | 1.230     | 0.151     |
| 6  | 1.26 | 1.68  | 4.35     | 68.771     | 0.772      | 1.000     | 0.122     |
| 7  | 1.08 | 1.44  | 4.63     | 62.691     | 0.662      | 0.781     | 0.096     |
| 8  | 0.90 | 1.20  | 4.93     | 55.642     | 0.552      | 0.578     | 0.071     |
| 9  | 0.72 | 0.96  | 5.26     | 47.471     | 0.441      | 0.394     | 0.048     |
| 10 | 0.54 | 0.72  | 5.61     | 38.010     | 0.331      | 0.237     | 0.029     |

Valori însumate:PC[kW]= 8.618307 SUMDelP[kW]= 11.57365 CPT= 1.342915

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps (i) [Pa] | Dpech (i) [Pa] |
|----|----------|----------------|----------------|
| 1  | 2.168    | 88.949         | 0.000          |
| 2  | 2.005    | 86.297         | 0.189          |
| 3  | 1.841    | 83.285         | 0.428          |
| 4  | 1.677    | 79.858         | 0.733          |
| 5  | 1.514    | 75.951         | 1.130          |
| 6  | 1.350    | 71.490         | 1.657          |
| 7  | 1.186    | 66.392         | 2.374          |
| 8  | 1.023    | 60.560         | 3.379          |
| 9  | 0.859    | 53.889         | 4.846          |
| 10 | 0.695    | 46.261         | 7.116          |
| 11 | 0.532    | 37.546         | 10.951         |

## Rezultatele din fișierul rnoust2

n\$=rnoust2 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 5 ;uR[m/s]= 26.7 ;v1[m/s]= 8.9 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.477995

| i  | r[m] | Gr    | kt     | kdps   | CF     | CP     | Lambr |
|----|------|-------|--------|--------|--------|--------|-------|
| 1  | 2.40 | .8000 | 0.1186 | 1.5736 | 1.9669 | 1.6719 | 2.88  |
| 2  | 2.20 | .8000 | 0.1364 | 1.5212 | 1.9015 | 1.6163 | 2.64  |
| 3  | 2.00 | .8000 | 0.1585 | 1.4610 | 1.8262 | 1.5523 | 2.40  |
| 4  | 1.80 | .8000 | 0.1864 | 1.3915 | 1.7394 | 1.4785 | 2.16  |
| 5  | 1.60 | .8000 | 0.2223 | 1.3112 | 1.6391 | 1.3932 | 1.92  |
| 6  | 1.40 | .8000 | 0.2698 | 1.2183 | 1.5229 | 1.2944 | 1.68  |
| 7  | 1.20 | .8000 | 0.3347 | 1.1106 | 1.3882 | 1.1800 | 1.44  |
| 8  | 1.00 | .8000 | 0.4278 | 0.9857 | 1.2321 | 1.0473 | 1.20  |
| 9  | 0.80 | .8000 | 0.5703 | 0.8410 | 1.0512 | 0.8935 | 0.96  |
| 10 | 0.60 | .8000 | 0.8118 | 0.6734 | 0.8417 | 0.7154 | 0.72  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 5 uR[m/s]= 26.7 v1[m/s]= 8.9 v3a[m/s]= 6.23 Delr= .2

| i | r[m] | Lambr | vt [m/s] | Delps [Pa] | DelPC [kW] | DelP [kW] | DelF [kN] |
|---|------|-------|----------|------------|------------|-----------|-----------|
| 1 | 2.40 | 2.88  | 3.04     | 76.343     | 1.302      | 2.177     | 0.288     |

|    |      |      |      |        |       |       |       |
|----|------|------|------|--------|-------|-------|-------|
| 2  | 2.20 | 2.64 | 3.21 | 73.803 | 1.194 | 1.929 | 0.255 |
| 3  | 2.00 | 2.40 | 3.39 | 70.881 | 1.085 | 1.685 | 0.223 |
| 4  | 1.80 | 2.16 | 3.58 | 67.511 | 0.977 | 1.444 | 0.191 |
| 5  | 1.60 | 1.92 | 3.80 | 63.616 | 0.868 | 1.209 | 0.160 |
| 6  | 1.40 | 1.68 | 4.03 | 59.107 | 0.760 | 0.983 | 0.130 |
| 7  | 1.20 | 1.44 | 4.29 | 53.882 | 0.651 | 0.768 | 0.102 |
| 8  | 1.00 | 1.20 | 4.57 | 47.823 | 0.543 | 0.568 | 0.075 |
| 9  | 0.80 | 0.96 | 4.87 | 40.800 | 0.434 | 0.388 | 0.051 |
| 10 | 0.60 | 0.72 | 5.20 | 32.669 | 0.326 | 0.233 | 0.031 |

Valori însumate:PC[kW]= 8.477995 SUMDelP[kW]= 11.38522 CPT= 1.342914

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|----|----------|---------------|---------------|
| 1  | 2.409    | 76.450        | 0.000         |
| 2  | 2.227    | 74.171        | 0.162         |
| 3  | 2.045    | 71.582        | 0.367         |
| 4  | 1.864    | 68.637        | 0.630         |
| 5  | 1.682    | 65.279        | 0.971         |
| 6  | 1.500    | 61.445        | 1.425         |
| 7  | 1.318    | 57.062        | 2.040         |
| 8  | 1.136    | 52.050        | 2.904         |
| 9  | 0.955    | 46.317        | 4.165         |
| 10 | 0.773    | 39.760        | 6.116         |
| 11 | 0.591    | 32.270        | 9.412         |

### Rezultatele din fișierul rnoust3

n\$=rnoust3 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 37.6 ;v1[m/s]= 9.4 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.090805

| i   | r[m] | Gr    | kt     | kdps   | CF     | CP     | Lambr |
|---|------|-------|--------|--------|--------|--------|-------|
| repartitie <b>constanta</b> a gradului de reactie cu raza |      |       |        |        |        |        |       |
| 1   | 2.16 | .8000 | 0.0731 | 1.7248 | 2.1560 | 1.8326 | 3.84  |
| 2   | 1.98 | .8000 | 0.0849 | 1.6829 | 2.1036 | 1.7880 | 3.52  |
| 3   | 1.80 | .8000 | 0.0997 | 1.6331 | 2.0413 | 1.7351 | 3.20  |
| 4   | 1.62 | .8000 | 0.1186 | 1.5736 | 1.9669 | 1.6719 | 2.88  |
| 5   | 1.44 | .8000 | 0.1432 | 1.5021 | 1.8776 | 1.5960 | 2.56  |
| 6   | 1.26 | .8000 | 0.1764 | 1.4158 | 1.7697 | 1.5043 | 2.24  |
| 7   | 1.08 | .8000 | 0.2223 | 1.3112 | 1.6391 | 1.3932 | 1.92  |
| 8   | 0.90 | .8000 | 0.2891 | 1.1842 | 1.4802 | 1.2582 | 1.60  |
| 9   | 0.72 | .8000 | 0.3927 | 1.0294 | 1.2868 | 1.0937 | 1.28  |
| 10  | 0.54 | .8000 | 0.5703 | 0.8410 | 1.0512 | 0.8935 | 0.96  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 4.5 uR[m/s]= 37.6 v1[m/s]= 9.4 v3a[m/s]= 6.579999 Delr= .18

| i  | r[m] | Lambr | vt [m/s] | Delps[Pa] | DelPC[kW] | DelP[kW] | DelF[kN] |
|----|------|-------|----------|-----------|-----------|----------|----------|
| 1  | 2.16 | 3.84  | 2.64     | 93.346    | 1.243     | 2.277    | 0.285    |
| 2  | 1.98 | 3.52  | 2.81     | 91.077    | 1.139     | 2.037    | 0.255    |
| 3  | 1.80 | 3.20  | 3.00     | 88.382    | 1.036     | 1.797    | 0.225    |
| 4  | 1.62 | 2.88  | 3.21     | 85.162    | 0.932     | 1.558    | 0.195    |
| 5  | 1.44 | 2.56  | 3.45     | 81.293    | 0.828     | 1.322    | 0.165    |
| 6  | 1.26 | 2.24  | 3.71     | 76.624    | 0.725     | 1.091    | 0.136    |
| 7  | 1.08 | 1.92  | 4.01     | 70.965    | 0.621     | 0.866    | 0.108    |
| 8  | 0.90 | 1.60  | 4.35     | 64.087    | 0.518     | 0.651    | 0.082    |
| 9  | 0.72 | 1.28  | 4.72     | 55.712    | 0.414     | 0.453    | 0.057    |
| 10 | 0.54 | 0.96  | 5.15     | 45.513    | 0.311     | 0.278    | 0.035    |

Valori însumate:PC[kW]= 8.090805 SUMDelP[kW]= 12.33023

CPT= 1.52398

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI  
COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|----|----------|---------------|---------------|
| 1  | 2.168    | 93.440        | 0.000         |
| 2  | 2.005    | 91.410        | 0.135         |
| 3  | 1.841    | 89.037        | 0.310         |
| 4  | 1.677    | 86.250        | 0.538         |
| 5  | 1.514    | 82.963        | 0.843         |
| 6  | 1.350    | 79.069        | 1.259         |
| 7  | 1.186    | 74.440        | 1.840         |
| 8  | 1.023    | 68.921        | 2.679         |
| 9  | 0.859    | 62.326        | 3.939         |
| 10 | 0.695    | 54.437        | 5.944         |
| 11 | 0.532    | 45.001        | 9.422         |

#### Rezultatele din fișierul rnoust4

n\$=rnoust4 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

**D[m]= 5** ;uR[m/s]= 34.4 ;v1[m/s]= 8.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 7.649246

| i   | r[m] | Gr    | kt     | kdps   | CF     | CP     | Lambr |
|---|------|-------|--------|--------|--------|--------|-------|
| repartitie <b>constanta</b> a gradului de reactie cu raza |      |       |        |        |        |        |       |
| 1   | 2.40 | .8000 | 0.0731 | 1.7248 | 2.1560 | 1.8326 | 3.84  |
| 2   | 2.20 | .8000 | 0.0849 | 1.6829 | 2.1036 | 1.7880 | 3.52  |
| 3   | 2.00 | .8000 | 0.0997 | 1.6331 | 2.0413 | 1.7351 | 3.20  |
| 4   | 1.80 | .8000 | 0.1186 | 1.5736 | 1.9669 | 1.6719 | 2.88  |
| 5   | 1.60 | .8000 | 0.1432 | 1.5021 | 1.8776 | 1.5960 | 2.56  |
| 6   | 1.40 | .8000 | 0.1764 | 1.4158 | 1.7697 | 1.5043 | 2.24  |
| 7   | 1.20 | .8000 | 0.2223 | 1.3112 | 1.6391 | 1.3932 | 1.92  |
| 8   | 1.00 | .8000 | 0.2891 | 1.1842 | 1.4802 | 1.2582 | 1.60  |
| 9   | 0.80 | .8000 | 0.3927 | 1.0294 | 1.2868 | 1.0937 | 1.28  |
| 10  | 0.60 | .8000 | 0.5703 | 0.8410 | 1.0512 | 0.8935 | 0.96  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 5 uR[m/s]= 34.4 v1[m/s]= 8.6 v3a[m/s]= 6.02 Delr= .2

| i  | r[m] | Lambr | vt [m/s] | Delps [Pa] | DelPC [kW] | DelP [kW] | DelF [kN] |
|----|------|-------|----------|------------|------------|-----------|-----------|
| 1  | 2.40 | 3.84  | 2.41     | 78.133     | 1.175      | 2.153     | 0.295     |
| 2  | 2.20 | 3.52  | 2.57     | 76.235     | 1.077      | 1.926     | 0.263     |
| 3  | 2.00 | 3.20  | 2.74     | 73.979     | 0.979      | 1.699     | 0.232     |
| 4  | 1.80 | 2.88  | 2.94     | 71.283     | 0.881      | 1.473     | 0.202     |
| 5  | 1.60 | 2.56  | 3.15     | 68.045     | 0.783      | 1.250     | 0.171     |
| 6  | 1.40 | 2.24  | 3.40     | 64.136     | 0.685      | 1.031     | 0.141     |
| 7  | 1.20 | 1.92  | 3.67     | 59.400     | 0.587      | 0.818     | 0.112     |
| 8  | 1.00 | 1.60  | 3.98     | 53.643     | 0.490      | 0.616     | 0.084     |
| 9  | 0.80 | 1.28  | 4.32     | 46.633     | 0.392      | 0.428     | 0.059     |
| 10 | 0.60 | 0.96  | 4.71     | 38.096     | 0.294      | 0.262     | 0.036     |

Valori însumate:PC[kW]= 7.649246 SUMDelP[kW]= 11.6573 CPT= 1.52398

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|---|----------|---------------|---------------|
| 1 | 2.409    | 78.212        | 0.000         |
| 2 | 2.227    | 76.513        | 0.113         |
| 3 | 2.045    | 74.527        | 0.259         |
| 4 | 1.864    | 72.194        | 0.450         |
| 5 | 1.682    | 69.443        | 0.706         |
| 6 | 1.500    | 66.183        | 1.054         |

|    |       |        |       |
|----|-------|--------|-------|
| 7  | 1.318 | 62.309 | 1.540 |
| 8  | 1.136 | 57.689 | 2.242 |
| 9  | 0.955 | 52.169 | 3.297 |
| 10 | 0.773 | 45.565 | 4.976 |
| 11 | 0.591 | 37.667 | 7.887 |

**Rezultatele din fișierul rnoust5**

n\$=rnoust5 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307

| i   | r[m] | Gr    | kt     | kdps   | CF     | CP     | Lambr |
|---|------|-------|--------|--------|--------|--------|-------|
| repartitie <b>constanta</b> a gradului de reactie cu raza |      |       |        |        |        |        |       |
| 1   | 2.16 | .6000 | 0.0706 | 0.7029 | 1.1716 | 0.9958 | 2.88  |
| 2   | 1.98 | .6000 | 0.0829 | 0.6932 | 1.1553 | 0.9820 | 2.64  |
| 3   | 1.80 | .6000 | 0.0985 | 0.6811 | 1.1352 | 0.9649 | 2.40  |
| 4   | 1.62 | .6000 | 0.1190 | 0.6660 | 1.1100 | 0.9435 | 2.16  |
| 5   | 1.44 | .6000 | 0.1462 | 0.6468 | 1.0780 | 0.9163 | 1.92  |
| 6   | 1.26 | .6000 | 0.1837 | 0.6221 | 1.0369 | 0.8814 | 1.68  |
| 7   | 1.08 | .6000 | 0.2371 | 0.5901 | 0.9835 | 0.8360 | 1.44  |
| 8   | 0.90 | .6000 | 0.3171 | 0.5479 | 0.9131 | 0.7761 | 1.20  |
| 9   | 0.72 | .6000 | 0.4446 | 0.4917 | 0.8195 | 0.6966 | 0.96  |
| 10  | 0.54 | .6000 | 0.6695 | 0.4165 | 0.6941 | 0.5900 | 0.72  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 4.5 uR[m/s]= 28.8 v1[m/s]= 9.6 v3a[m/s]= 6.72 Delr= .18

| i  | r[m] | Lambr | vt[m/s] | Delps[Pa] | DelPC[kW] | DelP[kW] | DelF[kN] |
|----|------|-------|---------|-----------|-----------|----------|----------|
| 1  | 2.16 | 2.88  | 1.95    | 39.680    | 1.324     | 1.318    | 0.162    |
| 2  | 1.98 | 2.64  | 2.10    | 39.129    | 1.213     | 1.192    | 0.146    |
| 3  | 1.80 | 2.40  | 2.27    | 38.447    | 1.103     | 1.064    | 0.130    |
| 4  | 1.62 | 2.16  | 2.47    | 37.593    | 0.993     | 0.937    | 0.115    |
| 5  | 1.44 | 1.92  | 2.69    | 36.510    | 0.883     | 0.809    | 0.099    |
| 6  | 1.26 | 1.68  | 2.96    | 35.119    | 0.772     | 0.681    | 0.083    |
| 7  | 1.08 | 1.44  | 3.28    | 33.309    | 0.662     | 0.553    | 0.068    |
| 8  | 0.90 | 1.20  | 3.65    | 30.926    | 0.552     | 0.428    | 0.052    |
| 9  | 0.72 | 0.96  | 4.10    | 27.756    | 0.441     | 0.307    | 0.038    |
| 10 | 0.54 | 0.72  | 4.63    | 23.509    | 0.331     | 0.195    | 0.024    |

Valori însumate:PC[kW]= 8.618307 SUMDelP[kW]= 7.48429 CPT= .8684177

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|----|----------|---------------|---------------|
| 1  | 2.168    | 39.702        | 0.000         |
| 2  | 2.005    | 39.211        | 0.082         |
| 3  | 1.841    | 38.615        | 0.191         |
| 4  | 1.677    | 37.887        | 0.339         |
| 5  | 1.514    | 36.985        | 0.543         |
| 6  | 1.350    | 35.859        | 0.833         |
| 7  | 1.186    | 34.437        | 1.258         |
| 8  | 1.023    | 32.622        | 1.903         |
| 9  | 0.859    | 30.284        | 2.926         |
| 10 | 0.695    | 27.248        | 4.649         |
| 11 | 0.532    | 23.285        | 7.813         |

**Rezultatele din fișierul rnoust6**

n\$=rnoust6 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE



$D[m] = 5$  ;  $uR[m/s] = 26.7$  ;  $v1[m/s] = 8.9$  ;  $RO[kg/m^3] = 1.225$  ;  $kv3a = .7$  ;  $PC[kW] = 8.477995$

| i   | r[m] | Gr    | kt     | kdps   | CF     | CP     | Lambr |
|---|------|-------|--------|--------|--------|--------|-------|
| repartitie <b>constanta</b> a gradului de reactie cu raza |      |       |        |        |        |        |       |
| 1   | 2.40 | .6000 | 0.0706 | 0.7029 | 1.1716 | 0.9958 | 2.88  |
| 2   | 2.20 | .6000 | 0.0829 | 0.6932 | 1.1553 | 0.9820 | 2.64  |
| 3   | 2.00 | .6000 | 0.0985 | 0.6811 | 1.1352 | 0.9649 | 2.40  |
| 4   | 1.80 | .6000 | 0.1190 | 0.6660 | 1.1100 | 0.9435 | 2.16  |
| 5   | 1.60 | .6000 | 0.1462 | 0.6468 | 1.0780 | 0.9163 | 1.92  |
| 6   | 1.40 | .6000 | 0.1837 | 0.6221 | 1.0369 | 0.8814 | 1.68  |
| 7   | 1.20 | .6000 | 0.2371 | 0.5901 | 0.9835 | 0.8360 | 1.44  |
| 8   | 1.00 | .6000 | 0.3171 | 0.5479 | 0.9131 | 0.7761 | 1.20  |
| 9   | 0.80 | .6000 | 0.4446 | 0.4917 | 0.8195 | 0.6966 | 0.96  |
| 10  | 0.60 | .6000 | 0.6695 | 0.4165 | 0.6941 | 0.5900 | 0.72  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE  
 $D[m] = 5$   $uR[m/s] = 26.7$   $v1[m/s] = 8.9$   $v3a[m/s] = 6.23$   $Delr = .2$

| i  | r[m] | Lambr | vt[m/s] | Delps[Pa] | DelPC[kW] | DelP[kW] | DelF[kN] |
|----|------|-------|---------|-----------|-----------|----------|----------|
| 1  | 2.40 | 2.88  | 1.81    | 34.104    | 1.302     | 1.297    | 0.171    |
| 2  | 2.20 | 2.64  | 1.95    | 33.631    | 1.194     | 1.172    | 0.155    |
| 3  | 2.00 | 2.40  | 2.10    | 33.045    | 1.085     | 1.047    | 0.138    |
| 4  | 1.80 | 2.16  | 2.29    | 32.311    | 0.977     | 0.921    | 0.122    |
| 5  | 1.60 | 1.92  | 2.50    | 31.380    | 0.868     | 0.795    | 0.105    |
| 6  | 1.40 | 1.68  | 2.75    | 30.184    | 0.760     | 0.670    | 0.089    |
| 7  | 1.20 | 1.44  | 3.04    | 28.629    | 0.651     | 0.544    | 0.072    |
| 8  | 1.00 | 1.20  | 3.39    | 26.581    | 0.543     | 0.421    | 0.056    |
| 9  | 0.80 | 0.96  | 3.80    | 23.856    | 0.434     | 0.302    | 0.040    |
| 10 | 0.60 | 0.72  | 4.29    | 20.206    | 0.326     | 0.192    | 0.025    |

Valori însumate:  $PC[kW] = 8.477995$   $SUMDelP[kW] = 7.362439$   $CPT = .8684174$

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;  $SUMDelP$  este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|----|----------|---------------|---------------|
| 1  | 2.409    | 34.123        | 0.000         |
| 2  | 2.227    | 33.701        | 0.071         |
| 3  | 2.045    | 33.189        | 0.164         |
| 4  | 1.864    | 32.563        | 0.291         |
| 5  | 1.682    | 31.788        | 0.467         |
| 6  | 1.500    | 30.820        | 0.716         |
| 7  | 1.318    | 29.598        | 1.081         |
| 8  | 1.136    | 28.038        | 1.635         |
| 9  | 0.955    | 26.029        | 2.515         |
| 10 | 0.773    | 23.419        | 3.996         |
| 11 | 0.591    | 20.013        | 6.715         |

### Rezultatele din fișierul rnoust7

n\$=rnoust7 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

$D[m] = 4.5$  ;  $uR[m/s] = 37.6$  ;  $v1[m/s] = 9.4$  ;  $RO[kg/m^3] = 1.225$  ;  $kv3a = .7$  ;  $PC[kW] = 8.090805$

| i   | r[m] | Gr    | kt     | kdps   | CF     | CP     | Lambr |
|---|------|-------|--------|--------|--------|--------|-------|
| repartitie <b>constanta</b> a gradului de reactie cu raza |      |       |        |        |        |        |       |
| 1   | 2.16 | .6000 | 0.0411 | 0.7276 | 1.2127 | 1.0308 | 3.84  |
| 2   | 1.98 | .6000 | 0.0485 | 0.7213 | 1.2021 | 1.0218 | 3.52  |
| 3   | 1.80 | .6000 | 0.0580 | 0.7132 | 1.1887 | 1.0104 | 3.20  |
| 4   | 1.62 | .6000 | 0.0706 | 0.7029 | 1.1716 | 0.9958 | 2.88  |

|    |      |       |        |        |        |        |      |
|----|------|-------|--------|--------|--------|--------|------|
| 5  | 1.44 | .6000 | 0.0877 | 0.6894 | 1.1491 | 0.9767 | 2.56 |
| 6  | 1.26 | .6000 | 0.1115 | 0.6714 | 1.1190 | 0.9512 | 2.24 |
| 7  | 1.08 | .6000 | 0.1462 | 0.6468 | 1.0780 | 0.9163 | 1.92 |
| 8  | 0.90 | .6000 | 0.1993 | 0.6124 | 1.0207 | 0.8676 | 1.60 |
| 9  | 0.72 | .6000 | 0.2865 | 0.5633 | 0.9388 | 0.7980 | 1.28 |
| 10 | 0.54 | .6000 | 0.4446 | 0.4917 | 0.8195 | 0.6966 | 0.96 |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 4.5 uR[m/s]= 37.6 v1[m/s]= 9.4 v3a[m/s]= 6.579999 Delr= .18

| i  | r[m] | Lambr | vt[m/s] | Delps[Pa] | DelPC[kW] | DelP[kW] | DelF[kN] |
|----|------|-------|---------|-----------|-----------|----------|----------|
| 1  | 2.16 | 3.84  | 1.48    | 39.378    | 1.243     | 1.281    | 0.160    |
| 2  | 1.98 | 3.52  | 1.61    | 39.035    | 1.139     | 1.164    | 0.146    |
| 3  | 1.80 | 3.20  | 1.75    | 38.601    | 1.036     | 1.046    | 0.131    |
| 4  | 1.62 | 2.88  | 1.91    | 38.044    | 0.932     | 0.928    | 0.116    |
| 5  | 1.44 | 2.56  | 2.11    | 37.313    | 0.828     | 0.809    | 0.101    |
| 6  | 1.26 | 2.24  | 2.35    | 36.337    | 0.725     | 0.690    | 0.086    |
| 7  | 1.08 | 1.92  | 2.64    | 35.005    | 0.621     | 0.569    | 0.071    |
| 8  | 0.90 | 1.60  | 3.00    | 33.143    | 0.518     | 0.449    | 0.056    |
| 9  | 0.72 | 1.28  | 3.45    | 30.485    | 0.414     | 0.331    | 0.041    |
| 10 | 0.54 | 0.96  | 4.01    | 26.612    | 0.311     | 0.216    | 0.027    |

Valori însumate:PC[kW]= 8.090805 SUMDelP[kW]= 7.483931 CPT= .9249922

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i)[m] | Delps(i)[Pa] | Dpech(i)[Pa] |
|----|---------|--------------|--------------|
| 1  | 2.168   | 39.392       | 0.000        |
| 2  | 2.005   | 39.087       | 0.050        |
| 3  | 1.841   | 38.710       | 0.117        |
| 4  | 1.677   | 38.237       | 0.209        |
| 5  | 1.514   | 37.637       | 0.340        |
| 6  | 1.350   | 36.862       | 0.532        |
| 7  | 1.186   | 35.843       | 0.820        |
| 8  | 1.023   | 34.480       | 1.274        |
| 9  | 0.859   | 32.621       | 2.028        |
| 10 | 0.695   | 30.040       | 3.362        |
| 11 | 0.532   | 26.398       | 5.953        |

### Rezultatele din fișierul rnoust8

n\$=rnoust8 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 5 ;uR[m/s]= 34.4 ;v1[m/s]= 8.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 7.649246

| i  | r[m] | Gr    | kt     | kdps   | CF     | CP     | Lambr |
|----|------|-------|--------|--------|--------|--------|-------|
| 1  | 2.40 | .6000 | 0.0411 | 0.7276 | 1.2127 | 1.0308 | 3.84  |
| 2  | 2.20 | .6000 | 0.0485 | 0.7213 | 1.2021 | 1.0218 | 3.52  |
| 3  | 2.00 | .6000 | 0.0580 | 0.7132 | 1.1887 | 1.0104 | 3.20  |
| 4  | 1.80 | .6000 | 0.0706 | 0.7029 | 1.1716 | 0.9958 | 2.88  |
| 5  | 1.60 | .6000 | 0.0877 | 0.6894 | 1.1491 | 0.9767 | 2.56  |
| 6  | 1.40 | .6000 | 0.1115 | 0.6714 | 1.1190 | 0.9512 | 2.24  |
| 7  | 1.20 | .6000 | 0.1462 | 0.6468 | 1.0780 | 0.9163 | 1.92  |
| 8  | 1.00 | .6000 | 0.1993 | 0.6124 | 1.0207 | 0.8676 | 1.60  |
| 9  | 0.80 | .6000 | 0.2865 | 0.5633 | 0.9388 | 0.7980 | 1.28  |
| 10 | 0.60 | .6000 | 0.4446 | 0.4917 | 0.8195 | 0.6966 | 0.96  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 5 uR[m/s]= 34.4 v1[m/s]= 8.6 v3a[m/s]= 6.02 Delr= .2

| i | r[m] | Lambr | vt[m/s] | Delps[Pa] | DelPC[kW] | DelP[kW] | DelF[kN] |
|---|------|-------|---------|-----------|-----------|----------|----------|
|---|------|-------|---------|-----------|-----------|----------|----------|

|    |      |      |      |        |       |       |       |
|----|------|------|------|--------|-------|-------|-------|
| 1  | 2.40 | 3.84 | 1.36 | 32.961 | 1.175 | 1.211 | 0.166 |
| 2  | 2.20 | 3.52 | 1.47 | 32.674 | 1.077 | 1.100 | 0.151 |
| 3  | 2.00 | 3.20 | 1.60 | 32.311 | 0.979 | 0.989 | 0.135 |
| 4  | 1.80 | 2.88 | 1.75 | 31.844 | 0.881 | 0.878 | 0.120 |
| 5  | 1.60 | 2.56 | 1.93 | 31.232 | 0.783 | 0.765 | 0.105 |
| 6  | 1.40 | 2.24 | 2.15 | 30.415 | 0.685 | 0.652 | 0.089 |
| 7  | 1.20 | 1.92 | 2.41 | 29.300 | 0.587 | 0.538 | 0.074 |
| 8  | 1.00 | 1.60 | 2.74 | 27.742 | 0.490 | 0.425 | 0.058 |
| 9  | 0.80 | 1.28 | 3.15 | 25.517 | 0.392 | 0.313 | 0.043 |
| 10 | 0.60 | 0.96 | 3.67 | 22.275 | 0.294 | 0.205 | 0.028 |

Valori însumate: PC[kW]= 7.649246    SUMDelP[kW]= 7.075491    CPT= .924992  
 PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ; SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI  
 COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|----|----------|---------------|---------------|
| 1  | 2.409    | 32.972        | 0.000         |
| 2  | 2.227    | 32.717        | 0.042         |
| 3  | 2.045    | 32.401        | 0.098         |
| 4  | 1.864    | 32.006        | 0.175         |
| 5  | 1.682    | 31.503        | 0.285         |
| 6  | 1.500    | 30.854        | 0.445         |
| 7  | 1.318    | 30.002        | 0.686         |
| 8  | 1.136    | 28.861        | 1.067         |
| 9  | 0.955    | 27.305        | 1.697         |
| 10 | 0.773    | 25.144        | 2.814         |
| 11 | 0.591    | 22.096        | 4.983         |

### Rezultatele din fișierul rnoust9

nş=rnoust9 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ; uR[m/s]= 28.8 ; v1[m/s]= 9.6 ; RO[kg/m3]= 1.225 ; kv3a= .7 ; PC[kW]= 8.618307

| i  | r[m] | Gr    | kt     | kdps   | CF     | CP     | Lambr |
|--|------|-------|--------|--------|--------|--------|-------|
| repartitie liniara a gradului de reactie cu raza |      |       |        |        |        |        |       |
| 1  | 2.16 | .8000 | 0.1186 | 1.5736 | 1.9669 | 1.6719 | 2.88  |
| 2  | 1.98 | .7900 | 0.1325 | 1.4586 | 1.8463 | 1.5694 | 2.64  |
| 3  | 1.80 | .7800 | 0.1501 | 1.3483 | 1.7286 | 1.4694 | 2.40  |
| 4  | 1.62 | .7700 | 0.1728 | 1.2412 | 1.6120 | 1.3702 | 2.16  |
| 5  | 1.44 | .7600 | 0.2027 | 1.1356 | 1.4942 | 1.2700 | 1.92  |
| 6  | 1.26 | .7500 | 0.2432 | 1.0294 | 1.3725 | 1.1667 | 1.68  |
| 7  | 1.08 | .7400 | 0.3000 | 0.9205 | 1.2440 | 1.0574 | 1.44  |
| 8  | 0.90 | .7300 | 0.3835 | 0.8063 | 1.1045 | 0.9388 | 1.20  |
| 9  | 0.72 | .7200 | 0.5148 | 0.6833 | 0.9490 | 0.8066 | 0.96  |
| 10   | 0.54 | .7100 | 0.7434 | 0.5472 | 0.7707 | 0.6551 | 0.72  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 4.5 uR[m/s]= 28.8 v1[m/s]= 9.6 v3a[m/s]= 6.72 Delr= .18

| i | r[m] | Lambr | vt [m/s] | Delps [Pa] | DelPC [kW] | DelP [kW] | DelF [kN] |
|---|------|-------|----------|------------|------------|-----------|-----------|
| 1 | 2.16 | 2.88  | 3.28     | 88.824     | 1.324      | 2.213     | 0.271     |
| 2 | 1.98 | 2.64  | 3.36     | 82.334     | 1.213      | 1.904     | 0.233     |
| 3 | 1.80 | 2.40  | 3.46     | 76.111     | 1.103      | 1.621     | 0.199     |
| 4 | 1.62 | 2.16  | 3.58     | 70.066     | 0.993      | 1.360     | 0.167     |
| 5 | 1.44 | 1.92  | 3.74     | 64.100     | 0.883      | 1.121     | 0.137     |
| 6 | 1.26 | 1.68  | 3.92     | 58.108     | 0.772      | 0.901     | 0.110     |
| 7 | 1.08 | 1.44  | 4.15     | 51.963     | 0.662      | 0.700     | 0.086     |
| 8 | 0.90 | 1.20  | 4.42     | 45.513     | 0.552      | 0.518     | 0.063     |
| 9 | 0.72 | 0.96  | 4.74     | 38.569     | 0.441      | 0.356     | 0.044     |

10 0.54 0.72 5.14 30.890 0.331 0.217 0.027  
 Valori însumate:PC[kW]= 8.618307 SUMDelP[kW]= 10.911 CPT= 1.266026  
 PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea  
 teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|----|----------|---------------|---------------|
| 1  | 2.168    | 88.949        | 0.000         |
| 2  | 2.005    | 82.725        | 0.121         |
| 3  | 1.841    | 76.801        | 0.278         |
| 4  | 1.677    | 71.101        | 0.484         |
| 5  | 1.514    | 65.549        | 0.760         |
| 6  | 1.350    | 60.064        | 1.136         |
| 7  | 1.186    | 54.555        | 1.665         |
| 8  | 1.023    | 48.918        | 2.434         |
| 9  | 0.859    | 43.028        | 3.604         |
| 10 | 0.695    | 36.731        | 5.498         |
| 11 | 0.532    | 29.836        | 8.858         |

### Rezultatele din fișierul rnoust10

nş=rnoust10 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

**D[m]= 4.5** ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307

| i   | r[m] | Gr           | kt     | kdps   | CF     | CP     | Lambr |
|---|------|--------------|--------|--------|--------|--------|-------|
| repartitie <b>patratice</b> a gradului de reactie cu raza |      |              |        |        |        |        |       |
| 1   | 2.16 | <b>.8000</b> | 0.1186 | 1.5736 | 1.9669 | 1.6719 | 2.88  |
| 2   | 1.98 | .7980        | 0.1356 | 1.5084 | 1.8903 | 1.6067 | 2.64  |
| 3   | 1.80 | .7920        | 0.1551 | 1.4147 | 1.7862 | 1.5183 | 2.40  |
| 4   | 1.62 | .7820        | 0.1780 | 1.2990 | 1.6612 | 1.4120 | 2.16  |
| 5   | 1.44 | .7680        | 0.2064 | 1.1685 | 1.5215 | 1.2933 | 1.92  |
| 6   | 1.26 | .7500        | 0.2432 | 1.0294 | 1.3725 | 1.1667 | 1.68  |
| 7   | 1.08 | .7280        | 0.2936 | 0.8865 | 1.2177 | 1.0351 | 1.44  |
| 8   | 0.90 | .7020        | 0.3676 | 0.7431 | 1.0586 | 0.8998 | 1.20  |
| 9   | 0.72 | .6720        | 0.4850 | 0.6007 | 0.8940 | 0.7599 | 0.96  |
| 10  | 0.54 | .6380        | 0.6939 | 0.4590 | 0.7194 | 0.6115 | 0.72  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 4.5 uR[m/s]= 28.8 v1[m/s]= 9.6 v3a[m/s]= 6.72 Delr= .18

| i  | r[m] | Lambr | vt [m/s] | Delps [Pa] | DelPC [kW] | DelP [kW] | DelF [kN] |
|----|------|-------|----------|------------|------------|-----------|-----------|
| 1  | 2.16 | 2.88  | 3.28     | 88.824     | 1.324      | 2.213     | 0.271     |
| 2  | 1.98 | 2.64  | 3.44     | 85.148     | 1.213      | 1.950     | 0.239     |
| 3  | 1.80 | 2.40  | 3.57     | 79.855     | 1.103      | 1.675     | 0.205     |
| 4  | 1.62 | 2.16  | 3.69     | 73.328     | 0.993      | 1.402     | 0.172     |
| 5  | 1.44 | 1.92  | 3.80     | 65.962     | 0.883      | 1.141     | 0.140     |
| 6  | 1.26 | 1.68  | 3.92     | 58.108     | 0.772      | 0.901     | 0.110     |
| 7  | 1.08 | 1.44  | 4.06     | 50.041     | 0.662      | 0.685     | 0.084     |
| 8  | 0.90 | 1.20  | 4.23     | 41.948     | 0.552      | 0.496     | 0.061     |
| 9  | 0.72 | 0.96  | 4.47     | 33.910     | 0.441      | 0.335     | 0.041     |
| 10 | 0.54 | 0.72  | 4.80     | 25.908     | 0.331      | 0.202     | 0.025     |

Valori însumate:PC[kW]= 8.618307 SUMDelP[kW]= 11.00095 CPT= 1.276463

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea  
 teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|---|----------|---------------|---------------|
| 1 | 2.168    | 88.949        | 0.000         |
| 2 | 2.005    | 85.568        | 0.175         |
| 3 | 1.841    | 80.617        | 0.365         |
| 4 | 1.677    | 74.465        | 0.578         |

|    |       |        |       |
|----|-------|--------|-------|
| 5  | 1.514 | 67.497 | 0.827 |
| 6  | 1.350 | 60.064 | 1.136 |
| 7  | 1.186 | 52.456 | 1.546 |
| 8  | 1.023 | 44.882 | 2.127 |
| 9  | 0.859 | 37.475 | 3.010 |
| 10 | 0.695 | 30.284 | 4.473 |
| 11 | 0.532 | 23.285 | 7.174 |

**Rezultatele din fișierul rnoust11**

nș=rnoust11 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307

| i   | r [m] | Gr           | kt     | kdps   | CF     | CP     | Lambr |
|---|-------|--------------|--------|--------|--------|--------|-------|
| repartitie <b>hiperbolica</b> a gradului de reactie cu raza |       |              |        |        |        |        |       |
| 1   | 2.16  | <b>.8000</b> | 0.1186 | 1.5736 | 1.9669 | 1.6719 | 2.88  |
| 2   | 1.98  | .7921        | 0.1333 | 1.4713 | 1.8576 | 1.5789 | 2.64  |
| 3   | 1.80  | .7843        | 0.1518 | 1.3718 | 1.7490 | 1.4866 | 2.40  |
| 4   | 1.62  | .7767        | 0.1757 | 1.2731 | 1.6392 | 1.3933 | 2.16  |
| 5   | 1.44  | .7692        | 0.2070 | 1.1737 | 1.5258 | 1.2969 | 1.92  |
| 6   | 1.26  | .7619        | 0.2491 | 1.0715 | 1.4063 | 1.1953 | 1.68  |
| 7   | 1.08  | .7547        | 0.3080 | 0.9640 | 1.2773 | 1.0857 | 1.44  |
| 8   | 0.90  | .7477        | 0.3941 | 0.8485 | 1.1349 | 0.9647 | 1.20  |
| 9   | 0.72  | .7407        | 0.5285 | 0.7216 | 0.9742 | 0.8280 | 0.96  |
| 10  | 0.54  | .7339        | 0.7609 | 0.5790 | 0.7889 | 0.6705 | 0.72  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 4.5 uR[m/s]= 28.8 v1[m/s]= 9.6 v3a[m/s]= 6.72 Delr= .18

| i  | r [m] | Lambr | vt [m/s] | Delps [Pa] | DelPC [kW] | DelP [kW] | DelF [kN] |
|----|-------|-------|----------|------------|------------|-----------|-----------|
| 1  | 2.16  | 2.88  | 3.28     | 88.824     | 1.324      | 2.213     | 0.271     |
| 2  | 1.98  | 2.64  | 3.38     | 83.054     | 1.213      | 1.916     | 0.235     |
| 3  | 1.80  | 2.40  | 3.50     | 77.433     | 1.103      | 1.640     | 0.201     |
| 4  | 1.62  | 2.16  | 3.64     | 71.866     | 0.993      | 1.383     | 0.170     |
| 5  | 1.44  | 1.92  | 3.81     | 66.254     | 0.883      | 1.145     | 0.140     |
| 6  | 1.26  | 1.68  | 4.02     | 60.481     | 0.772      | 0.923     | 0.113     |
| 7  | 1.08  | 1.44  | 4.26     | 54.416     | 0.662      | 0.719     | 0.088     |
| 8  | 0.90  | 1.20  | 4.54     | 47.898     | 0.552      | 0.532     | 0.065     |
| 9  | 0.72  | 0.96  | 4.87     | 40.733     | 0.441      | 0.365     | 0.045     |
| 10 | 0.54  | 0.72  | 5.26     | 32.683     | 0.331      | 0.222     | 0.027     |

Valori însumate:PC[kW]= 8.618307 SUMDelP[kW]= 11.05809 CPT= 1.283093

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|----|----------|---------------|---------------|
| 1  | 2.168    | 88.949        | 0.000         |
| 2  | 2.005    | 83.453        | 0.135         |
| 3  | 1.841    | 78.147        | 0.309         |
| 4  | 1.677    | 72.957        | 0.536         |
| 5  | 1.514    | 67.802        | 0.838         |
| 6  | 1.350    | 62.597        | 1.248         |
| 7  | 1.186    | 57.246        | 1.820         |
| 8  | 1.023    | 51.637        | 2.647         |
| 9  | 0.859    | 45.640        | 3.893         |
| 10 | 0.695    | 39.097        | 5.889         |
| 11 | 0.532    | 31.816        | 9.385         |

**Rezultatele din fișierul rnoust12**

nș=rnoust12 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

**D[m]= 5** ;uR[m/s]= 26.7 ;v1[m/s]= 8.9 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.477995

| i   | r[m] | Gr           | kt     | kdps   | CF     | CP     | Lambr |
|---|------|--------------|--------|--------|--------|--------|-------|
| repartitie <b>liniara</b> a gradului de reactie cu raza |      |              |        |        |        |        |       |
| 1   | 2.40 | <b>.8000</b> | 0.1186 | 1.5736 | 1.9669 | 1.6719 | 2.88  |
| 2   | 2.20 | .7900        | 0.1325 | 1.4586 | 1.8463 | 1.5694 | 2.64  |
| 3   | 2.00 | .7800        | 0.1501 | 1.3483 | 1.7286 | 1.4694 | 2.40  |
| 4   | 1.80 | .7700        | 0.1728 | 1.2412 | 1.6120 | 1.3702 | 2.16  |
| 5   | 1.60 | .7600        | 0.2027 | 1.1356 | 1.4942 | 1.2700 | 1.92  |
| 6   | 1.40 | .7500        | 0.2432 | 1.0294 | 1.3725 | 1.1667 | 1.68  |
| 7   | 1.20 | .7400        | 0.3000 | 0.9205 | 1.2440 | 1.0574 | 1.44  |
| 8   | 1.00 | .7300        | 0.3835 | 0.8063 | 1.1045 | 0.9388 | 1.20  |
| 9   | 0.80 | .7200        | 0.5148 | 0.6833 | 0.9490 | 0.8066 | 0.96  |
| 10  | 0.60 | .7100        | 0.7434 | 0.5472 | 0.7707 | 0.6551 | 0.72  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 5 uR[m/s]= 26.7 v1[m/s]= 8.9 v3a[m/s]= 6.23 Delr= .2

| i  | r[m] | Lambr | vt[m/s] | Delps[Pa] | DelPC[kW] | DelP[kW] | DelF[kN] |
|----|------|-------|---------|-----------|-----------|----------|----------|
| 1  | 2.40 | 2.88  | 3.04    | 76.343    | 1.302     | 2.177    | 0.288    |
| 2  | 2.20 | 2.64  | 3.11    | 70.765    | 1.194     | 1.873    | 0.248    |
| 3  | 2.00 | 2.40  | 3.21    | 65.417    | 1.085     | 1.595    | 0.211    |
| 4  | 1.80 | 2.16  | 3.32    | 60.220    | 0.977     | 1.338    | 0.177    |
| 5  | 1.60 | 1.92  | 3.46    | 55.093    | 0.868     | 1.103    | 0.146    |
| 6  | 1.40 | 1.68  | 3.64    | 49.943    | 0.760     | 0.886    | 0.117    |
| 7  | 1.20 | 1.44  | 3.84    | 44.661    | 0.651     | 0.688    | 0.091    |
| 8  | 1.00 | 1.20  | 4.10    | 39.117    | 0.543     | 0.509    | 0.067    |
| 9  | 0.80 | 0.96  | 4.40    | 33.149    | 0.434     | 0.350    | 0.046    |
| 10 | 0.60 | 0.72  | 4.76    | 26.550    | 0.326     | 0.213    | 0.028    |

Valori Șnsumate:PC[kW]= 8.477995 SUMDelP[kW]= 10.73336 CPT= 1.266025

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|----|----------|---------------|---------------|
| 1  | 2.409    | 76.450        | 0.000         |
| 2  | 2.227    | 71.101        | 0.104         |
| 3  | 2.045    | 66.009        | 0.239         |
| 4  | 1.864    | 61.110        | 0.416         |
| 5  | 1.682    | 56.339        | 0.653         |
| 6  | 1.500    | 51.624        | 0.977         |
| 7  | 1.318    | 46.889        | 1.431         |
| 8  | 1.136    | 42.045        | 2.092         |
| 9  | 0.955    | 36.982        | 3.097         |
| 10 | 0.773    | 31.570        | 4.726         |
| 11 | 0.591    | 25.643        | 7.614         |

**Rezultatele din fișierul rnoust13**

nș=rnoust13 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

**D[m]= 5** ;uR[m/s]= 26.7 ;v1[m/s]= 8.9 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.477995

| i   | r[m] | Gr           | kt     | kdps   | CF     | CP     | Lambr |
|---|------|--------------|--------|--------|--------|--------|-------|
| repartitie <b>patratice</b> a gradului de reactie cu raza |      |              |        |        |        |        |       |
| 1   | 2.40 | <b>.8000</b> | 0.1186 | 1.5736 | 1.9669 | 1.6719 | 2.88  |

|    |      |       |        |        |        |        |      |
|----|------|-------|--------|--------|--------|--------|------|
| 2  | 2.20 | .7980 | 0.1356 | 1.5084 | 1.8903 | 1.6067 | 2.64 |
| 3  | 2.00 | .7920 | 0.1551 | 1.4147 | 1.7862 | 1.5183 | 2.40 |
| 4  | 1.80 | .7820 | 0.1780 | 1.2990 | 1.6612 | 1.4120 | 2.16 |
| 5  | 1.60 | .7680 | 0.2064 | 1.1685 | 1.5215 | 1.2933 | 1.92 |
| 6  | 1.40 | .7500 | 0.2432 | 1.0294 | 1.3725 | 1.1667 | 1.68 |
| 7  | 1.20 | .7280 | 0.2936 | 0.8865 | 1.2177 | 1.0351 | 1.44 |
| 8  | 1.00 | .7020 | 0.3676 | 0.7431 | 1.0586 | 0.8998 | 1.20 |
| 9  | 0.80 | .6720 | 0.4850 | 0.6007 | 0.8940 | 0.7599 | 0.96 |
| 10 | 0.60 | .6380 | 0.6939 | 0.4590 | 0.7194 | 0.6115 | 0.72 |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE  
 $D[m]=5$   $uR[m/s]=26.7$   $v1[m/s]=8.9$   $v3a[m/s]=6.23$   $Delr=.2$

| i  | r[m] | Lambr | vt[m/s] | Delps[Pa] | DelPC[kW] | DelP[kW] | DelF[kN] |
|----|------|-------|---------|-----------|-----------|----------|----------|
| 1  | 2.40 | 2.88  | 3.04    | 76.343    | 1.302     | 2.177    | 0.288    |
| 2  | 2.20 | 2.64  | 3.19    | 73.183    | 1.194     | 1.918    | 0.254    |
| 3  | 2.00 | 2.40  | 3.31    | 68.634    | 1.085     | 1.648    | 0.218    |
| 4  | 1.80 | 2.16  | 3.42    | 63.024    | 0.977     | 1.379    | 0.182    |
| 5  | 1.60 | 1.92  | 3.53    | 56.693    | 0.868     | 1.123    | 0.148    |
| 6  | 1.40 | 1.68  | 3.64    | 49.943    | 0.760     | 0.886    | 0.117    |
| 7  | 1.20 | 1.44  | 3.76    | 43.010    | 0.651     | 0.674    | 0.089    |
| 8  | 1.00 | 1.20  | 3.93    | 36.053    | 0.543     | 0.488    | 0.065    |
| 9  | 0.80 | 0.96  | 4.14    | 29.145    | 0.434     | 0.330    | 0.044    |
| 10 | 0.60 | 0.72  | 4.45    | 22.268    | 0.326     | 0.199    | 0.026    |

Valori însumate: PC[kW]= 8.477995 SUMDelP[kW]= 10.82184 CPT= 1.276463

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i)[m] | Delps(i)[Pa] | Dpech(i)[Pa] |
|----|---------|--------------|--------------|
| 1  | 2.409   | 76.450       | 0.000        |
| 2  | 2.227   | 73.544       | 0.150        |
| 3  | 2.045   | 69.289       | 0.314        |
| 4  | 1.864   | 64.001       | 0.497        |
| 5  | 1.682   | 58.012       | 0.711        |
| 6  | 1.500   | 51.624       | 0.977        |
| 7  | 1.318   | 45.085       | 1.329        |
| 8  | 1.136   | 38.576       | 1.828        |
| 9  | 0.955   | 32.209       | 2.587        |
| 10 | 0.773   | 26.029       | 3.844        |
| 11 | 0.591   | 20.013       | 6.166        |

### Rezultatele din fișierul rnoust14

n\$=rnoust14 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

$D[m]=5$  ;  $uR[m/s]=26.7$  ;  $v1[m/s]=8.9$  ;  $RO[kg/m^3]=1.225$  ;  $kv3a=.7$  ;  $PC[kW]=8.477995$

| i   | r[m] | Gr           | kt     | kdps   | CF     | CP     | Lambr |
|---|------|--------------|--------|--------|--------|--------|-------|
| repartitie <b>hiperbolica</b> a gradului de reacție cu raza |      |              |        |        |        |        |       |
| 1   | 2.40 | <b>.8000</b> | 0.1186 | 1.5736 | 1.9669 | 1.6719 | 2.88  |
| 2   | 2.20 | .7921        | 0.1333 | 1.4713 | 1.8576 | 1.5789 | 2.64  |
| 3   | 2.00 | .7843        | 0.1518 | 1.3718 | 1.7490 | 1.4866 | 2.40  |
| 4   | 1.80 | .7767        | 0.1757 | 1.2731 | 1.6392 | 1.3933 | 2.16  |
| 5   | 1.60 | .7692        | 0.2070 | 1.1737 | 1.5258 | 1.2970 | 1.92  |
| 6   | 1.40 | .7619        | 0.2491 | 1.0715 | 1.4063 | 1.1953 | 1.68  |
| 7   | 1.20 | .7547        | 0.3080 | 0.9640 | 1.2773 | 1.0857 | 1.44  |
| 8   | 1.00 | .7477        | 0.3941 | 0.8485 | 1.1349 | 0.9647 | 1.20  |
| 9   | 0.80 | .7407        | 0.5285 | 0.7216 | 0.9742 | 0.8280 | 0.96  |
| 10  | 0.60 | .7339        | 0.7609 | 0.5790 | 0.7889 | 0.6705 | 0.72  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 5 uR[m/s]= 26.7 v1[m/s]= 8.9 v3a[m/s]= 6.23 Delr= .2

| i  | r[m] | Lambr | vt[m/s] | Delps[Pa] | DelPC[kW] | DelP[kW] | DelF[kN] |
|----|------|-------|---------|-----------|-----------|----------|----------|
| 1  | 2.40 | 2.88  | 3.04    | 76.343    | 1.302     | 2.177    | 0.288    |
| 2  | 2.20 | 2.64  | 3.13    | 71.384    | 1.194     | 1.885    | 0.249    |
| 3  | 2.00 | 2.40  | 3.24    | 66.552    | 1.085     | 1.613    | 0.213    |
| 4  | 1.80 | 2.16  | 3.38    | 61.768    | 0.977     | 1.361    | 0.180    |
| 5  | 1.60 | 1.92  | 3.54    | 56.944    | 0.868     | 1.126    | 0.149    |
| 6  | 1.40 | 1.68  | 3.72    | 51.983    | 0.760     | 0.908    | 0.120    |
| 7  | 1.20 | 1.44  | 3.95    | 46.770    | 0.651     | 0.707    | 0.093    |
| 8  | 1.00 | 1.20  | 4.21    | 41.168    | 0.543     | 0.523    | 0.069    |
| 9  | 0.80 | 0.96  | 4.52    | 35.010    | 0.434     | 0.359    | 0.048    |
| 10 | 0.60 | 0.72  | 4.88    | 28.090    | 0.326     | 0.218    | 0.029    |

Valori însumate:PC[kW]= 8.477995 SUMDelP[kW]= 10.87805 CPT= 1.283092

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|----|----------|---------------|---------------|
| 1  | 2.409    | 76.450        | 0.000         |
| 2  | 2.227    | 71.726        | 0.116         |
| 3  | 2.045    | 67.166        | 0.265         |
| 4  | 1.864    | 62.705        | 0.460         |
| 5  | 1.682    | 58.275        | 0.720         |
| 6  | 1.500    | 53.801        | 1.073         |
| 7  | 1.318    | 49.202        | 1.565         |
| 8  | 1.136    | 44.381        | 2.275         |
| 9  | 0.955    | 39.227        | 3.346         |
| 10 | 0.773    | 33.603        | 5.062         |
| 11 | 0.591    | 27.346        | 8.066         |

### Rezultatele din fișierul rnoust15

n\$=rnoust15 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 37.6 ;v1[m/s]= 9.4 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.090805

| i  | r[m] | Gr    | kt     | kdps   | CF     | CP     | Lambr |
|--|------|-------|--------|--------|--------|--------|-------|
| repartitie liniara a gradului de reactie cu raza |      |       |        |        |        |        |       |
| 1  | 2.17 | .8000 | 0.0726 | 1.7265 | 2.1581 | 1.8344 | 3.85  |
| 2  | 2.00 | .7900 | 0.0803 | 1.6107 | 2.0389 | 1.7331 | 3.56  |
| 3  | 1.84 | .7800 | 0.0899 | 1.5015 | 1.9250 | 1.6363 | 3.27  |
| 4  | 1.68 | .7700 | 0.1021 | 1.3974 | 1.8148 | 1.5426 | 2.98  |
| 5  | 1.51 | .7600 | 0.1178 | 1.2967 | 1.7062 | 1.4503 | 2.69  |
| 6  | 1.35 | .7500 | 0.1386 | 1.1979 | 1.5971 | 1.3576 | 2.40  |
| 7  | 1.19 | .7400 | 0.1669 | 1.0988 | 1.4849 | 1.2622 | 2.11  |
| 8  | 1.02 | .7300 | 0.2066 | 0.9973 | 1.3661 | 1.1612 | 1.82  |
| 9  | 0.86 | .7200 | 0.2650 | 0.8902 | 1.2363 | 1.0509 | 1.53  |
| 10   | 0.70 | .7100 | 0.3563 | 0.7734 | 1.0894 | 0.9260 | 1.24  |
| 11   | 0.53 | .7000 | 0.5127 | 0.6417 | 0.9167 | 0.7792 | 0.95  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 4.5 uR[m/s]= 37.6 v1[m/s]= 9.4 v3a[m/s]= 6.579999 Delr= .1636364

| i | r[m] | Lambr | vt[m/s] | Delps[Pa] | DelPC[kW] | DelP[kW] | DelF[kN] |
|---|------|-------|---------|-----------|-----------|----------|----------|
| 1 | 2.17 | 3.85  | 2.63    | 93.440    | 1.134     | 2.080    | 0.260    |
| 2 | 2.00 | 3.56  | 2.69    | 87.173    | 1.048     | 1.817    | 0.227    |
| 3 | 1.84 | 3.27  | 2.76    | 81.263    | 0.963     | 1.576    | 0.197    |
| 4 | 1.68 | 2.98  | 2.86    | 75.627    | 0.877     | 1.353    | 0.169    |
| 5 | 1.51 | 2.69  | 2.98    | 70.179    | 0.792     | 1.148    | 0.144    |



|    |      |      |      |        |       |       |       |
|----|------|------|------|--------|-------|-------|-------|
| 6  | 1.35 | 2.40 | 3.13 | 64.829 | 0.706 | 0.959 | 0.120 |
| 7  | 1.19 | 2.11 | 3.31 | 59.470 | 0.621 | 0.783 | 0.098 |
| 8  | 1.02 | 1.82 | 3.53 | 53.973 | 0.535 | 0.621 | 0.078 |
| 9  | 0.86 | 1.53 | 3.80 | 48.176 | 0.449 | 0.472 | 0.059 |
| 10 | 0.70 | 1.24 | 4.14 | 41.859 | 0.364 | 0.337 | 0.042 |
| 11 | 0.53 | 0.95 | 4.56 | 34.727 | 0.278 | 0.217 | 0.027 |

Valori însumate:PC[kW]= 8.090805 SUMDelP[kW]= 11.36304 CPT= 1.404439

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|----|----------|---------------|---------------|
| 1  | 2.168    | 93.440        | 0.000         |
| 2  | 2.005    | 87.173        | 0.083         |
| 3  | 1.841    | 81.263        | 0.192         |
| 4  | 1.677    | 75.627        | 0.338         |
| 5  | 1.514    | 70.179        | 0.536         |
| 6  | 1.350    | 64.829        | 0.812         |
| 7  | 1.186    | 59.470        | 1.210         |
| 8  | 1.023    | 53.973        | 1.804         |
| 9  | 0.859    | 48.176        | 2.737         |
| 10 | 0.695    | 41.859        | 4.303         |
| 11 | 0.532    | 34.727        | 7.187         |

### Rezultatele din fișierul rnoust16

n\$=rnoust16 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

**D[m]= 4.5** ;uR[m/s]= 37.6 ;v1[m/s]= 9.4 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.090805

| i   | r[m] | Gr    | kt     | kdps   | CF     | CP     | Lambr |
|---|------|-------|--------|--------|--------|--------|-------|
| repartitie <b>patratice</b> a gradului de reactie cu raza |      |       |        |        |        |        |       |
| 1   | 2.16 | .8000 | 0.0731 | 1.7248 | 2.1560 | 1.8326 | 3.84  |
| 2   | 1.98 | .7980 | 0.0843 | 1.6669 | 2.0889 | 1.7756 | 3.52  |
| 3   | 1.80 | .7920 | 0.0971 | 1.5745 | 1.9880 | 1.6898 | 3.20  |
| 4   | 1.62 | .7820 | 0.1122 | 1.4551 | 1.8607 | 1.5816 | 2.88  |
| 5   | 1.44 | .7680 | 0.1308 | 1.3170 | 1.7148 | 1.4576 | 2.56  |
| 6   | 1.26 | .7500 | 0.1551 | 1.1677 | 1.5569 | 1.3234 | 2.24  |
| 7   | 1.08 | .7280 | 0.1888 | 1.0133 | 1.3919 | 1.1831 | 1.92  |
| 8   | 0.90 | .7020 | 0.2387 | 0.8579 | 1.2220 | 1.0387 | 1.60  |
| 9   | 0.72 | .6720 | 0.3192 | 0.7029 | 1.0459 | 0.8891 | 1.28  |
| 10  | 0.54 | .6380 | 0.4653 | 0.5472 | 0.8576 | 0.7290 | 0.96  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 4.5 uR[m/s]= 37.6 v1[m/s]= 9.4 v3a[m/s]= 6.579999 Delr= .18

| i  | r[m] | Lambr | vt [m/s] | Delps [Pa] | DelPC [kW] | DelP [kW] | DelF [kN] |
|----|------|-------|----------|------------|------------|-----------|-----------|
| 1  | 2.16 | 3.84  | 2.64     | 93.346     | 1.243      | 2.277     | 0.285     |
| 2  | 1.98 | 3.52  | 2.79     | 90.216     | 1.139      | 2.023     | 0.253     |
| 3  | 1.80 | 3.20  | 2.92     | 85.214     | 1.036      | 1.750     | 0.219     |
| 4  | 1.62 | 2.88  | 3.04     | 78.751     | 0.932      | 1.474     | 0.185     |
| 5  | 1.44 | 2.56  | 3.15     | 71.274     | 0.828      | 1.208     | 0.151     |
| 6  | 1.26 | 2.24  | 3.27     | 63.195     | 0.725      | 0.959     | 0.120     |
| 7  | 1.08 | 1.92  | 3.41     | 54.842     | 0.621      | 0.735     | 0.092     |
| 8  | 0.90 | 1.60  | 3.59     | 46.428     | 0.518      | 0.538     | 0.067     |
| 9  | 0.72 | 1.28  | 3.84     | 38.040     | 0.414      | 0.368     | 0.046     |
| 10 | 0.54 | 0.96  | 4.20     | 29.614     | 0.311      | 0.226     | 0.028     |

Valori însumate:PC[kW]= 8.090805 SUMDelP[kW]= 11.55909 CPT= 1.42867

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|----|----------|---------------|---------------|
| 1  | 2.168    | 93.440        | 0.000         |
| 2  | 2.005    | 90.541        | 0.124         |
| 3  | 1.841    | 85.817        | 0.260         |
| 4  | 1.677    | 79.668        | 0.412         |
| 5  | 1.514    | 72.533        | 0.590         |
| 6  | 1.350    | 64.829        | 0.812         |
| 7  | 1.186    | 56.897        | 1.110         |
| 8  | 1.023    | 48.990        | 1.537         |
| 9  | 0.859    | 41.257        | 2.203         |
| 10 | 0.695    | 33.746        | 3.338         |
| 11 | 0.532    | 26.398        | 5.515         |

### Rezultatele din fișierul rnoust17

nş=rnoust17 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

**D[m]= 4.5** ;uR[m/s]= 37.6 ;v1[m/s]= 9.4 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.090805

| i   | r[m] | Gr    | kt     | kdps   | CF     | CP     | Lambr |
|---|------|-------|--------|--------|--------|--------|-------|
| repartitie <b>hiperbolica</b> a gradului de reacție cu raza |      |       |        |        |        |        |       |
| 1   | 2.17 | .8000 | 0.0726 | 1.7265 | 2.1581 | 1.8344 | 3.85  |
| 2   | 2.00 | .7921 | 0.0809 | 1.6266 | 2.0536 | 1.7455 | 3.56  |
| 3   | 1.84 | .7843 | 0.0911 | 1.5311 | 1.9521 | 1.6593 | 3.27  |
| 4   | 1.68 | .7767 | 0.1041 | 1.4385 | 1.8520 | 1.5742 | 2.98  |
| 5   | 1.51 | .7692 | 0.1209 | 1.3471 | 1.7512 | 1.4885 | 2.69  |
| 6   | 1.35 | .7619 | 0.1430 | 1.2551 | 1.6473 | 1.4002 | 2.40  |
| 7   | 1.19 | .7547 | 0.1728 | 1.1604 | 1.5376 | 1.3069 | 2.11  |
| 8   | 1.02 | .7477 | 0.2145 | 1.0604 | 1.4183 | 1.2055 | 1.82  |
| 9   | 0.86 | .7407 | 0.2754 | 0.9517 | 1.2848 | 1.0921 | 1.53  |
| 10  | 0.70 | .7339 | 0.3699 | 0.8300 | 1.1308 | 0.9612 | 1.24  |
| 11  | 0.53 | .7273 | 0.5303 | 0.6896 | 0.9481 | 0.8059 | 0.95  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 4.5 uR[m/s]= 37.6 v1[m/s]= 9.4 v3a[m/s]= 6.579999 Delr= .1636364

| i  | r[m] | Lambr | vt [m/s] | Delps [Pa] | DelPC [kW] | DelP [kW] | DelF [kN] |
|----|------|-------|----------|------------|------------|-----------|-----------|
| 1  | 2.17 | 3.85  | 2.63     | 93.440     | 1.134      | 2.080     | 0.260     |
| 2  | 2.00 | 3.56  | 2.71     | 88.032     | 1.048      | 1.830     | 0.229     |
| 3  | 1.84 | 3.27  | 2.80     | 82.864     | 0.963      | 1.598     | 0.200     |
| 4  | 1.68 | 2.98  | 2.92     | 77.850     | 0.877      | 1.381     | 0.173     |
| 5  | 1.51 | 2.69  | 3.06     | 72.904     | 0.792      | 1.178     | 0.147     |
| 6  | 1.35 | 2.40  | 3.23     | 67.927     | 0.706      | 0.989     | 0.124     |
| 7  | 1.19 | 2.11  | 3.43     | 62.802     | 0.621      | 0.811     | 0.101     |
| 8  | 1.02 | 1.82  | 3.67     | 57.389     | 0.535      | 0.645     | 0.081     |
| 9  | 0.86 | 1.53  | 3.95     | 51.505     | 0.449      | 0.491     | 0.061     |
| 10 | 0.70 | 1.24  | 4.30     | 44.918     | 0.364      | 0.350     | 0.044     |
| 11 | 0.53 | 0.95  | 4.71     | 37.319     | 0.278      | 0.224     | 0.028     |

Valori însumate:PC[kW]= 8.090805 SUMDelP[kW]= 11.57672 CPT= 1.430849

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|---|----------|---------------|---------------|
| 1 | 2.168    | 93.440        | 0.000         |
| 2 | 2.005    | 88.032        | 0.093         |
| 3 | 1.841    | 82.864        | 0.216         |
| 4 | 1.677    | 77.850        | 0.378         |
| 5 | 1.514    | 72.904        | 0.599         |
| 6 | 1.350    | 67.927        | 0.905         |
| 7 | 1.186    | 62.802        | 1.343         |

|    |       |        |       |
|----|-------|--------|-------|
| 8  | 1.023 | 57.389 | 1.994 |
| 9  | 0.859 | 51.505 | 3.007 |
| 10 | 0.695 | 44.918 | 4.686 |
| 11 | 0.532 | 37.319 | 7.733 |

### Rezultatele din fișierul rnoust18

nș=rnoust18 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

**D[m]= 5** ;uR[m/s]= 34.4 ;v1[m/s]= 8.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 7.649246

| i   | r[m] | Gr    | kt     | dps    | CF     | CP     | Lambr |
|---|------|-------|--------|--------|--------|--------|-------|
| repartitie <b>liniara</b> a gradului de reactie cu raza |      |       |        |        |        |        |       |
| 1   | 2.40 | .8000 | 0.0731 | 1.7248 | 2.1560 | 1.8326 | 3.84  |
| 2   | 2.20 | .7900 | 0.0820 | 1.6052 | 2.0319 | 1.7271 | 3.52  |
| 3   | 2.00 | .7800 | 0.0934 | 1.4916 | 1.9123 | 1.6255 | 3.20  |
| 4   | 1.80 | .7700 | 0.1082 | 1.3822 | 1.7951 | 1.5258 | 2.88  |
| 5   | 1.60 | .7600 | 0.1280 | 1.2750 | 1.6776 | 1.4260 | 2.56  |
| 6   | 1.40 | .7500 | 0.1551 | 1.1677 | 1.5569 | 1.3234 | 2.24  |
| 7   | 1.20 | .7400 | 0.1938 | 1.0574 | 1.4289 | 1.2146 | 1.92  |
| 8   | 1.00 | .7300 | 0.2517 | 0.9406 | 1.2884 | 1.0952 | 1.60  |
| 9   | 0.80 | .7200 | 0.3442 | 0.8122 | 1.1280 | 0.9588 | 1.28  |
| 10  | 0.60 | .7100 | 0.5084 | 0.6654 | 0.9371 | 0.7966 | 0.96  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 5 uR[m/s]= 34.4 v1[m/s]= 8.6 v3a[m/s]= 6.02 Delr= .2

| i  | r[m] | Lambr | vt [m/s] | Delps [Pa] | DelPC [kW] | DelP [kW] | DelF [kN] |
|----|------|-------|----------|------------|------------|-----------|-----------|
| 1  | 2.40 | 3.84  | 2.41     | 78.133     | 1.175      | 2.153     | 0.295     |
| 2  | 2.20 | 3.52  | 2.48     | 72.716     | 1.077      | 1.860     | 0.254     |
| 3  | 2.00 | 3.20  | 2.57     | 67.572     | 0.979      | 1.592     | 0.218     |
| 4  | 1.80 | 2.88  | 2.68     | 62.616     | 0.881      | 1.345     | 0.184     |
| 5  | 1.60 | 2.56  | 2.82     | 57.759     | 0.783      | 1.117     | 0.153     |
| 6  | 1.40 | 2.24  | 2.99     | 52.897     | 0.685      | 0.907     | 0.124     |
| 7  | 1.20 | 1.92  | 3.20     | 47.902     | 0.587      | 0.714     | 0.098     |
| 8  | 1.00 | 1.60  | 3.46     | 42.608     | 0.490      | 0.536     | 0.073     |
| 9  | 0.80 | 1.28  | 3.79     | 36.792     | 0.392      | 0.376     | 0.051     |
| 10 | 0.60 | 0.96  | 4.20     | 30.141     | 0.294      | 0.234     | 0.032     |

Valori însumate:PC[kW]= 7.649246 SUMDelP[kW]= 10.83247 CPT= 1.416149

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|----|----------|---------------|---------------|
| 1  | 2.409    | 78.212        | 0.000         |
| 2  | 2.227    | 72.966        | 0.069         |
| 3  | 2.045    | 68.020        | 0.161         |
| 4  | 1.864    | 63.302        | 0.283         |
| 5  | 1.682    | 58.742        | 0.449         |
| 6  | 1.500    | 54.264        | 0.680         |
| 7  | 1.318    | 49.778        | 1.013         |
| 8  | 1.136    | 45.177        | 1.510         |
| 9  | 0.955    | 40.325        | 2.291         |
| 10 | 0.773    | 35.038        | 3.602         |
| 11 | 0.591    | 29.068        | 6.015         |

### Rezultatele din fișierul rnoust19

nș=rnoust19 program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

**D[m]= 5** ; uR[m/s]= 34.4 ; v1[m/s]= 8.6 ; RO[kg/m3]= 1.225 ; kv3a= .7 ; PC[kW]= 7.649246

| i   | r[m] | Gr    | kt     | kdps   | CF     | CP     | Lambr |
|---|------|-------|--------|--------|--------|--------|-------|
| repartitie <b>patratice</b> a gradului de reactie cu raza |      |       |        |        |        |        |       |
| 1   | 2.40 | .8000 | 0.0731 | 1.7248 | 2.1560 | 1.8326 | 3.84  |
| 2   | 2.20 | .7980 | 0.0843 | 1.6669 | 2.0889 | 1.7756 | 3.52  |
| 3   | 2.00 | .7920 | 0.0971 | 1.5745 | 1.9880 | 1.6898 | 3.20  |
| 4   | 1.80 | .7820 | 0.1122 | 1.4551 | 1.8607 | 1.5816 | 2.88  |
| 5   | 1.60 | .7680 | 0.1308 | 1.3170 | 1.7148 | 1.4576 | 2.56  |
| 6   | 1.40 | .7500 | 0.1551 | 1.1677 | 1.5569 | 1.3234 | 2.24  |
| 7   | 1.20 | .7280 | 0.1888 | 1.0133 | 1.3919 | 1.1831 | 1.92  |
| 8   | 1.00 | .7020 | 0.2387 | 0.8579 | 1.2220 | 1.0387 | 1.60  |
| 9   | 0.80 | .6720 | 0.3192 | 0.7029 | 1.0459 | 0.8891 | 1.28  |
| 10  | 0.60 | .6380 | 0.4653 | 0.5472 | 0.8576 | 0.7290 | 0.96  |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE  
**D[m]= 5**    uR[m/s]= 34.4    v1[m/s]= 8.6    v3a[m/s]= 6.02    Delr= .2

| i  | r[m] | Lambr | vt[m/s] | Delps[Pa] | DelPC[kW] | DelP[kW] | DelF[kN] |
|----|------|-------|---------|-----------|-----------|----------|----------|
| 1  | 2.40 | 3.84  | 2.41    | 78.133    | 1.175     | 2.153    | 0.295    |
| 2  | 2.20 | 3.52  | 2.55    | 75.513    | 1.077     | 1.912    | 0.262    |
| 3  | 2.00 | 3.20  | 2.67    | 71.326    | 0.979     | 1.655    | 0.226    |
| 4  | 1.80 | 2.88  | 2.78    | 65.917    | 0.881     | 1.394    | 0.191    |
| 5  | 1.60 | 2.56  | 2.88    | 59.659    | 0.783     | 1.142    | 0.156    |
| 6  | 1.40 | 2.24  | 2.99    | 52.897    | 0.685     | 0.907    | 0.124    |
| 7  | 1.20 | 1.92  | 3.12    | 45.904    | 0.587     | 0.695    | 0.095    |
| 8  | 1.00 | 1.60  | 3.28    | 38.862    | 0.490     | 0.509    | 0.070    |
| 9  | 0.80 | 1.28  | 3.51    | 31.841    | 0.392     | 0.348    | 0.048    |
| 10 | 0.60 | 0.96  | 3.84    | 24.787    | 0.294     | 0.214    | 0.029    |

Valori însumate: PC[kW]= 7.649246    SUMDelP[kW]= 10.92825    CPT= 1.42867

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ; SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|----|----------|---------------|---------------|
| 1  | 2.409    | 78.212        | 0.000         |
| 2  | 2.227    | 75.786        | 0.104         |
| 3  | 2.045    | 71.832        | 0.218         |
| 4  | 1.864    | 66.684        | 0.345         |
| 5  | 1.682    | 60.713        | 0.494         |
| 6  | 1.500    | 54.264        | 0.680         |
| 7  | 1.318    | 47.625        | 0.929         |
| 8  | 1.136    | 41.006        | 1.287         |
| 9  | 0.955    | 34.533        | 1.844         |
| 10 | 0.773    | 28.246        | 2.794         |
| 11 | 0.591    | 22.096        | 4.617         |

### Rezultatele din fișierul rnoust20

n\$=rnoust20    program basic MODNT.BAS

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

**D[m]= 5**    uR[m/s]= 34.4    v1[m/s]= 8.6    RO[kg/m3]= 1.225    kv3a= .7    PC[kW]= 7.649246

| i   | r[m] | Gr    | kt     | kdps   | CF     | CP     | Lambr |
|---|------|-------|--------|--------|--------|--------|-------|
| Repartitie <b>hiperbolice</b> a gradului de reactie cu raza |      |       |        |        |        |        |       |
| 1   | 2.40 | .8000 | 0.0731 | 1.7248 | 2.1560 | 1.8326 | 3.84  |
| 2   | 2.20 | .7921 | 0.0826 | 1.6210 | 2.0465 | 1.7395 | 3.52  |
| 3   | 2.00 | .7843 | 0.0947 | 1.5208 | 1.9390 | 1.6481 | 3.20  |
| 4   | 1.80 | .7767 | 0.1104 | 1.4223 | 1.8313 | 1.5566 | 2.88  |

|    |      |       |        |        |        |        |      |
|----|------|-------|--------|--------|--------|--------|------|
| 5  | 1.60 | .7692 | 0.1313 | 1.3236 | 1.7206 | 1.4625 | 2.56 |
| 6  | 1.40 | .7619 | 0.1598 | 1.2219 | 1.6038 | 1.3632 | 2.24 |
| 7  | 1.20 | .7547 | 0.2003 | 1.1143 | 1.4765 | 1.2550 | 1.92 |
| 8  | 1.00 | .7477 | 0.2604 | 0.9968 | 1.3332 | 1.1332 | 1.60 |
| 9  | 0.80 | .7407 | 0.3560 | 0.8640 | 1.1664 | 0.9914 | 1.28 |
| 10 | 0.60 | .7339 | 0.5240 | 0.7089 | 0.9658 | 0.8209 | 0.96 |

REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE

D[m]= 5 uR[m/s]= 34.4 v1[m/s]= 8.6 v3a[m/s]= 6.02 Delr= .2

| i  | r [m] | Lambr | vt [m/s] | Delps [Pa] | DelPC [kW] | DelP [kW] | DelF [kN] |
|----|-------|-------|----------|------------|------------|-----------|-----------|
| 1  | 2.40  | 3.84  | 2.41     | 78.133     | 1.175      | 2.153     | 0.295     |
| 2  | 2.20  | 3.52  | 2.50     | 73.430     | 1.077      | 1.873     | 0.256     |
| 3  | 2.00  | 3.20  | 2.61     | 68.892     | 0.979      | 1.614     | 0.221     |
| 4  | 1.80  | 2.88  | 2.73     | 64.433     | 0.881      | 1.372     | 0.188     |
| 5  | 1.60  | 2.56  | 2.89     | 59.958     | 0.783      | 1.146     | 0.157     |
| 6  | 1.40  | 2.24  | 3.08     | 55.353     | 0.685      | 0.934     | 0.128     |
| 7  | 1.20  | 1.92  | 3.31     | 50.480     | 0.587      | 0.737     | 0.101     |
| 8  | 1.00  | 1.60  | 3.58     | 45.155     | 0.490      | 0.555     | 0.076     |
| 9  | 0.80  | 1.28  | 3.92     | 39.140     | 0.392      | 0.388     | 0.053     |
| 10 | 0.60  | 0.96  | 4.33     | 32.112     | 0.294      | 0.241     | 0.033     |

Valori însumate: PC[kW]= 7.649246 SUMDelP[kW]= 11.01326 CPT= 1.439784

PRECIZĂRI: PC este puterea cinetică asociată TURBINEI ;SUMDelP este puterea teoretică extrasă ; CPT este coeficientul teoretic global al TURBINEI

COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL

| i  | r(i) [m] | Delps(i) [Pa] | Dpech(i) [Pa] |
|----|----------|---------------|---------------|
| 1  | 2.400    | 78.133        | 0.000         |
| 2  | 2.200    | 73.430        | 0.101         |
| 3  | 2.000    | 68.892        | 0.237         |
| 4  | 1.800    | 64.433        | 0.423         |
| 5  | 1.600    | 59.958        | 0.684         |
| 6  | 1.400    | 55.353        | 1.064         |
| 7  | 1.200    | 50.480        | 1.637         |
| 8  | 1.000    | 45.155        | 2.550         |
| 9  | 0.800    | 39.140        | 4.107         |
| 10 | 0.600    | 32.112        | 7.047         |

### 3.3.4. Sinteza rezultatelor obținute cu programul MODNT.BAS

SINTEZA PENTRU D=4,5 m

| $\bar{R}$            | v <sub>1</sub> [m/s] | Pt [kW] | n [rpm] | Sol [-] |
|----------------------|----------------------|---------|---------|---------|
| Lamb <sub>r</sub> =3 |                      |         |         |         |
| 0,8                  | 9,6                  | 11,574  | 122     | 0,239   |
| 0,6                  | 9,6                  | 7,484   | 122     |         |
| 0,7                  | 9,6                  | 9,145   | 122     | 0,199   |
| Lamb <sub>r</sub> =4 |                      |         |         |         |
| 0,8                  | 9,4                  | 12,330  | 160     | 0,170   |
| 0,6                  | 9,4                  | 7,484   | 160     |         |
| 0,7                  | 9,4                  | 9,368   | 160     | 0,136   |

SINTEZA PENTRU D=5 m

| $\bar{R}$            | v <sub>1</sub> [m/s] | Pt [kW] | n [rpm] | Sol [-] |
|----------------------|----------------------|---------|---------|---------|
| Lamb <sub>r</sub> =3 |                      |         |         |         |
| 0,8                  | 8,9                  | 11,385  | 102     | 0,226   |
| 0,6                  | 8,9                  | 7,362   | 102     |         |

|                      |     |        |       |       |
|----------------------|-----|--------|-------|-------|
| 0,7                  | 8,9 | 8,996  | 102   | 0,199 |
| Lamb <sub>r</sub> =4 |     |        |       |       |
| 0,8                  | 8,6 | 11,657 | 131,4 | 0,170 |
| 0,6                  | 8,6 | 7,075  | 131,4 |       |
| 0,7                  | 8,6 | 8,857  | 131,4 | 0,136 |

### 3.4. Programul MODNTURB

#### 3.4.1. Programul MODNTURB.BAS

```

REM program de asamblare a modelului nou pentru o turbina in studiu
REM rezultatele se retin in RCINj.word
CLEAR
CLS
PRINT "Date pentru amsablul turbinei D[m], uR[m/s], v1[m/s], RO[kg/m3] "
INPUT "D[m]= ?"; D
INPUT " uR[m/s]=?"; uR
INPUT " v1[m/s]=?"; v1
INPUT "kv3a=?"; kv3a
LET v3a = kv3a * v1
INPUT " RO[kg/m3]=?"; RO
LET kvTa = (1 + kv3a) / 2
LET vTa = kvTa * v1
LET PC = RO * v1 * v1 * v1 / 2 * 3.1415 * D * D / 4
LET dint = .2 * D
LET LambD = uR / v1
INPUT "Nr.sectiuni de calcul"; imax
REM LET Delr = (D / 2 - dint / 2) / imax
Delr = .25
INPUT "Gradul de reactie la raza D/2 GrD=?"; GrD
DIM r(imax)
DIM kt(imax)
DIM Lambr(imax)
DIM Gr(imax)
DIM u(imax)
DIM DelPC(imax)
DIM kdps(imax)
DIM v3a(imax)
DIM Delps(imax)
DIM Dpech(imax)
DIM vt(imax)
DIM Delp(imax)
DIM CM(imax)
DIM CF(imax)
DIM CF1(imax)
DIM CP(imax)
DIM Delf(imax)
DIM Delf1(imax)
5 LET SUMDelp = 0
6 LET SUMDelf = 0
PRINT "Optiuni pentru gradele de reactie cu raza"
PRINT "q=1 repartitie constanta, q=2 r liniara, q=3 r. patratica ,q=4
r.hiperbolica,q=5 pentru END"
INPUT "q=?"; Q
r(1) = D / 2
FOR i = 2 TO imax

```

```

r(i) = r(i - 1) - Delr
NEXT i
FOR i = 1 TO imax
u(i) = uR / r(1) * r(i)
LET Lambr(i) = LambD * 2 * r(i) / D
LET DelPC(i) = RO * v1 * v1 * v1 * 3.1415 * r(i) * Delr
IF Q = 1 THEN GOTO 10
IF Q = 2 THEN GOTO 20
IF Q = 3 THEN GOTO 30
IF Q = 4 THEN GOTO 40
IF Q = 5 THEN END
10 LET Gr(i) = GrD
11 GOTO 100
20 LET Gr(i) = GrD - .01 * (i - 1)
21 GOTO 100
30 LET Gr(i) = GrD - .002 * (i - 1) * (i - 1)
31 GOTO 100
40 LET Gr(i) = GrD / (1 + .01 * (i - 1))
41 GOTO 100
100 LET kt(i) = -(1 - Gr(i)) + SQR((1 - Gr(i)) * (1 - Gr(i)) + (1 - kv3a *
kv3a) / (Lambr(i) * Lambr(i)))
PRINT kt(i)
105 LET vt(i) = kt(i) * u(i)
110 LET kdps(i) = 2 * Gr(i) * kt(i) * Lambr(i) * Lambr(i)
115 LET Delps(i) = kdps(i) * v1 * v1 / 2 * RO
120 LET CM(i) = 2 * kvTa * kt(i) * Lambr(i)
130 LET CP(i) = CM(i) * Lambr(i)
140 LET CF(i) = CP(i) / kvTa
145 LET DelPC(i) = (RO / 2) * v1 * v1 * v1 * 2 * 3.1415 * r(i) * Delr
150 LET DelP(i) = CP(i) * DelPC(i)
155 LET DelF(i) = CF(i) * (RO / 2) * v1 * v1 * 2 * 3.1415 * r(i) * Delr
160 LET SUMDelP = SUMDelP + DelP(i)
170 LET SUMDelF = SUMDelF + DelF(i)
200 NEXT i
210 LET CPT = SUMDelP / PC
250 PRINT "REZULTATELE CALCULELOR (coeficienti) PENTRU URMĂTOARELE DATE "
260 PRINT "D[m]="; D; ";uR[m/s]="; uR; ";v1[m/s]="; v1; ";RO[kg/m3]="; RO;
";kv3a="; kv3a; ";PC[kW]="; PC / 1000
270 PRINT
"
"
280 PRINT " i      r[m]      Gr      kt      kdps      CF      CP
Lambr "
282 PRINT
"
"
290 FOR i = 1 TO imax
300 PRINT USING "###  ##.##  .####  #.####  #.####  #.####  #.####
##.## "; i; r(i); Gr(i); kt(i); kdps(i); CF(i); CP(i); Lambr(i)
310 NEXT i
320 PRINT "pentru continuare introduceti x=1 ; pentru oprire x=2"
PRINT "pentru alta varianta pentru Gr x=3"
330 INPUT "x=? "; x
340 IF x = 2 THEN END
IF x = 3 THEN GOTO 5
341 CLS
400 PRINT "REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMĂTOARELE DATE"
410 PRINT "D[m]="; D; "uR[m/s]="; uR; "v1[m/s]="; v1; "v3a[m/s]="; v3a;
"Delr="; Delr
420 PRINT
"
"

```

```

430 PRINT " i      r[m]      Lambr      vt[m/s]      Delps[Pa]      DelPC[kW]      DelP[kW]
DelF[kN]      "
440 PRINT
"_____ "
441 FOR i = 1 TO imax
450 PRINT USING "###      ##.##      ##.##      ###.##      ###.###      ###.###      ###.###
##.###"; i; r(i); Lambr(i); vt(i); Delps(i); DelPC(i) / 1000; DelP(i) / 1000;
DelF(i) / 1000
451 NEXT i
460 PRINT "Valori insumate:"; "PC[kW]="; PC / 1000; " SUMDelP[kW]="; SUMDelP /
1000; "      CPT="; CPT
471 PRINT "PRECIZARI: PC este puterea cinetica asociata TURBINEI ;SUMDelP este
puterea teoretica extrasa ; CPT este coeficientul teoretic global al TURBINEI "
475 INPUT " CONT o tasta numerica"; Q
CLS
480 PRINT "Petru continuare se ofera variante y=1 reluare a coeficienților"
481 PRINT "                      y=2 variante pentru Gr"
482 PRINT "                      y=4 END"
      PRINT "                      y=3 continuare"
483 IF y = 1 THEN GOTO 210
484 IF y = 2 THEN GOTO 5
485 IF y = 4 THEN END
490 CLS
500 LET Dpech(1) = 0
510 FOR i = 2 TO imax
520 LET Dpech(i) = -RO * ((vt(i - 1) * vt(i - 1) / r(i - 1) - vt(i) * vt(i) /
r(i))) * (r(i - 1) - r(i)) + Dpech(i - 1)
525 NEXT i
530 PRINT "COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL"
540 PRINT "      i      r(i)[m]      Delps(i)[Pa]      Dpech(i)[Pa]
"
550 FOR i = 1 TO imax
560 PRINT USING "      ###      ###.###      ###.###      ###.###"; i;
r(i); Delps(i); Dpech(i)
570 NEXT i
600 PRINT "OPTIUNI O=1 GOTO 5 pentru variante sau O=2 continuare sau O=3 pentru
END"
610 INPUT "O="; o
620 IF o = 1 THEN GOTO 5
621 IF o = 3 THEN END
700 REM Comparatii pentru fortele axiale
701 LET SumF = 0
      LET SUMF1 = 0
710 FOR i = 1 TO imax
720 CF1(i) = 1 - (kv3a * kv3a) + kdps(i)
721 DelF1(i) = CF1(i) * RO * (v1 * v1 / 2) * 2 * 3.1415 * r(i) * Delr
722 LET SUMF1 = SUMF1 + DelF1(i)
730 NEXT i
731 CLS
740 PRINT "COMPARATII PENTRU FORTELE AXIALE (COEFICIENTI Si FORTE)"
750 PRINT "_____ "
760 PRINT " i      r(i)      CF      CF1      DelF[kN]      DelF1[kN]
"
770 PRINT "_____ "
780 FOR i = 1 TO imax
790 PRINT USING "###      ##.###      #.###      #.###      ###.###      ###.###";
i; r(i); CF(i); CF1(i); DelF(i) / 1000; DelF1(i) / 1000
791 NEXT i
800 PRINT "SUMF[kN]="; SUMDelF / 1000, "SUMF1[kN]="; SUMF1 / 1000
810 PRINT "OPTIUNI 1 :END; 2 :variante noi; 3 :      continuare"
815 INPUT "q="; Q

```



```
820 IF Q = 2 GOTO 5
      IF Q = 3 GOTO 850
      IF Q = 1 GOTO 900
850 REM CALCULE CINEMATICE PENTRU PROIECTAREA UNEI TURBINE
INPUT "codul turbinei"; Cod$
INPUT "enter filename"; n$
OPEN n$ FOR OUTPUT AS #1
DIM DelS(imax)
DIM DelQ(imax)
DIM v3(imax)
DIM w1(imax)
DIM w3(imax)
DIM Winf(imax)
DIM delpd(imax)
DIM delptot(imax)
DIM bet1gr(imax)
DIM bet3gr(imax)
DIM betinf(imax)
DIM alf3gr(imax)
DIM cylt(imax)
REM numar de palete z= 2,3,4,5
DIM t2(imax)
DIM t3(imax)
DIM t4(imax)
DIM t5(imax)
DIM l2(imax)
DIM l3(imax)
DIM l4(imax)
DIM l5(imax)
INPUT "portanta maxima utilizata in calcul"; Cymax
omeg = uR * 2 / D
PI = 3.141592654#
FOR i = 1 TO imax
u(i) = omeg * r(i)
DelS(i) = 2 * PI * r(i) * Delr
DelQ(i) = DelS(i) * vTa
v3(i) = SQR(v3a ^ 2 + vt(i) ^ 2)
w1(i) = SQR(u(i) ^ 2 + v1 ^ 2)
w3(i) = SQR(v3a(i) ^ 2 + (u(i) + vt(i)) ^ 2)
Winf(i) = SQR((vTa ^ 2) + (u(i) + vt(i) / 2) ^ 2)
bet1gr(i) = 180 / PI * ATN(v1 / u(i))
bet3gr(i) = 180 / PI * ATN(v3a / (u(i) + vt(i)))
betinf(i) = 180 / PI * ATN(vTa / (u(i) + vt(i) / 2))
alf3gr(i) = 180 / PI * ATN(-v3a / (vt(i))) + 180
cylt(i) = 2 * vt(i) / Winf(i)
t2(i) = 2 * PI * r(i) / 2: t3 = 2 * PI * r(i) / 3: t4(i) = 2 * OI * r(i) / 4:
t5(i) = 2 * PI * r(i) / 5
l2(i) = cylt(i) * t2(i) / Cymax
l3(i) = cylt(i) * t3(i) / Cymax
l4(i) = cylt(i) * t4(i) / Cymax
l5(i) = cylt(i) * t5(i) / Cymax
NEXT i
SumQ = 0
FOR i = 1 TO imax
SumQ = SumQ + DelQ(i)
NEXT i
Qtot = SumQ
PRINT Qtot
SumP = 0
FOR i = 1 TO imax
SumP = SumP + DelP(i)
```

```
NEXT i
Ptot = SumP
PRINT Ptot
SumF = 0
FOR i = 1 TO imax
SumF = SumF + Delf(i)
NEXT i
Ftot = SumF
PRINT Ftot
CLS
PRINT #1, "REZULTATELE CALCULELOR CINEMATICE PENTRU TURBINA CU CODUL AFISAT"
PRINT #1,
"*****"
PRINT #1, "programe,coduri,constante,dimensiuni:"
PRINT #1, "PROGRAM MODNTURB.BAS"; " REZULTATE IN WORD:"; n$
PRINT #1, "Codul turbinei :"; Cod$
PRINT #1, "CONSTANTE:"
PRINT #1, "D[m]: "; D; ", db[m]: "; .2 * D; ", Del r [m]: "; Delr; ", RO[kg/m3]
: "; RO
PRINT #1, "uR[m/s]= "; uR; ", V1[m/s] : "; v1; ", V3a[m/s] "; v3a; ", VTa(m /
s) = "; vTa; "
PRINT #1, "GrD= "; GrD; ", LambD= "; LambD; ", kv3a= "; kv3a; ", kvTa= "; kvTa
PRINT #1,
"*****"
PRINT #1, "Qtot[m3/s]= "; Qtot; ", Pt[W]= "; Ptot; ", Faxtot[N]= "; Ftot
PRINT #1, "Coeficient de portanta de calcul="; Cymax
PRINT #1,
"_____ "
PRINT #1,
"*****"
PRINT #1, "r[m] ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; r(i);
NEXT i
PRINT #1, "ur[m/s] ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; u(i);
NEXT i
PRINT #1, "kt ";
FOR i = 1 TO imax
PRINT #1, USING " #.### "; kt(i);
NEXT i
PRINT #1, "vt[m/s] ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; vt(i);
NEXT i
PRINT #1, "v3[m/s] ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; v3(i);
NEXT i
PRINT #1, "w1[m/s] ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; w1(i);
NEXT i
PRINT #1, "w3[m/s] ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; w3(i);
NEXT i
PRINT #1, "winf[m/s]";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; Winf(i);
```

```
NEXT i
PRINT #1, "bet1[gr] ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; bet1gr(i);
NEXT i
PRINT #1, "bet3[gr] ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; bet3gr(i);
NEXT i
PRINT #1, "betinf[gr]";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; betinf(i);
NEXT i
PRINT #1, "alf3[gr] ";
FOR i = 1 TO imax
PRINT #1, USING "####.# "; alf3gr(i);
NEXT i
PRINT #1, "cyl/t[-] ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; cylt(i);
NEXT i
REM urmeaza analiza pasului, a corzii si a soliditatii la diferite numere de
palete
REM z:2,3,4,5 ;t:t2,t3,t4,t5 ;l:l2,l3,l4,l5 lm:lm2,lm3,lm4,lm5
REM S:S2,S3,S4,S5
FOR i = 1 TO imax
t2(i) = 2 * PI * r(i) / 2
t3(i) = 2 * PI * r(i) / 3
t4(i) = 2 * PI * r(i) / 4
t5(i) = 2 * PI * r(i) / 5
l2(i) = cylt(i) * t2(i) / Cymax
l3(i) = cylt(i) * t3(i) / Cymax
l4(i) = cylt(i) * t4(i) / Cymax
l5(i) = cylt(i) * t5(i) / Cymax
NEXT i
suml2 = 0: suml3 = 0: suml4 = 0: suml5 = 0
FOR i = 1 TO imax
suml2 = suml2 + l2(i): suml3 = suml3 + l3(i): suml4 = suml4 + l4(i): suml5 =
suml5 + l5(i)
NEXT i
lm2 = suml2 / imax
lm3 = suml3 / imax
lm4 = suml4 / imax
lm5 = suml5 / imax
Sol2 = 2 * lm2 / 1.885 / D
Sol3 = 3 * lm3 / 1.885 / D
Sol4 = 4 * lm4 / 1.885 / D
Sol5 = 5 * lm5 / 1.885 / D
PRINT #1,
"*****"
PRINT #1, "REZULTATE CORZI SI SOLIDITATI LA NR.DE PALETE 2,3,4,5"
PRINT #1,
"*****"
PRINT #1, "z t[m] l[m] r(i) [m]"
PRINT #1, " ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; r(i);
NEXT i
PRINT #1, ""
```

```
PRINT #1,
"
"
PRINT #1, "2      t2      ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; t2(i);
NEXT i
PRINT #1, ""
PRINT #1, "          12 ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; 12(i);
NEXT i
PRINT #1, ""
PRINT #1, "3      t3      ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; t3(i);
NEXT i
PRINT #1, ""
PRINT #1, "          13 ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; 13(i);
NEXT i
PRINT #1, ""
PRINT #1, "4      t4      ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; t4(i);
NEXT i
PRINT #1, ""
PRINT #1, "          14 ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; 14(i);
NEXT i
PRINT #1, ""
PRINT #1, "5      t5      ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; t5(i);
NEXT i
PRINT #1, ""
PRINT #1, "          15 ";
FOR i = 1 TO imax
PRINT #1, USING "##.## "; 15(i);
NEXT i
PRINT
PRINT
PRINT #1, "lm2 [m]= "; lm2; " lm3 [m]= "; lm3; " lm4 [m]= "; lm4; " lm5 [m]= "; lm5
PRINT #1,
"
PRINT #1, "Sol2= "; Sol2; " Sol3= "; Sol3; " Sol4= "; Sol4; " Sol5= "; Sol5
PRINT #1,
"*****"
CLOSE
900 END
```

### 3.4.2. Cazurile analizate

| Nr. crt. | D [m] | Tipul turbinei | $u_R$ [m/s] | $\text{Lamb}_r$ [-] | $\bar{R}$ [-] | $k_{v3a}$ [-] | $k_{vTa}$ [-] | Numele fișierului de rezultate |
|----------|-------|----------------|-------------|---------------------|---------------|---------------|---------------|--------------------------------|
| 1        | 5     | "Tip A"        | 26,7        | 3                   | 0,8           | 0,7           | 0,85          | Rcin1                          |
| 2        |       | "Tip B"        | 34,4        | 4                   | 0,8           |               |               | Rcin2                          |
| 3        |       | "Tip A"        | 26,7        | 3                   | 0,7           |               |               | Rcin3                          |
| 4        |       | "Tip B"        | 34,4        | 4                   | 0,7           |               |               | Rcin4                          |
| 5        | 4,5   | "Tip A"        | 28,8        | 3                   | 0,8           | 0,7           | 0,85          | Rcin5                          |
| 6        |       | "Tip B"        | 37,6        | 4                   | 0,8           |               |               | Rcin6                          |
| 7        |       | "Tip A"        | 28,8        | 3                   | 0,7           |               |               | Rcin7                          |
| 8        |       | "Tip B"        | 37,6        | 4                   | 0,7           |               |               | Rcin8                          |

### 3.4.3. Rezultatele ale programului MODNTURB.BAS

#### Rezultatele din fișierul rcin1

REZULTATELE CALCULELOR CINEMATICE PENTRU TURBINA CU CODUL AFISAT

\*\*\*\*\*

programe,coduri,constante,dimensiuni:

PROGRAM MODNTURB.BAS REZULTATE IN WORD:rcin1

CONSTANTE:

D[m]: 5 , db[m]: 1 , Del r [m]: .2 , RO[kg/m3] : 1.225

$u_R$ [m/s]= 26.7 ,  $V_1$ [m/s] : 8.9 ,  $V_{3a}$ [m/s] 6.23 ,  $V_{Ta}$ (m / s) = 7.565

GrD= .8 , LambD= 3 , kv3a= .7 , kvTa= .85

\*\*\*\*\*

$Q_{tot}$ [m3/s]= 142.5969 ,  $P_t$ [W]= 11385.22 ,  $F_{axtot}$ [N]= 1504.986

\*\*\*\*\*

|                 |       |       |       |       |       |       |       |       |       |       |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| r[m]            | 2.40  | 2.20  | 2.00  | 1.80  | 1.60  | 1.40  | 1.20  | 1.00  | 0.80  | 0.60  |
| $u_r$ [m/s]     | 25.63 | 23.50 | 21.36 | 19.22 | 17.09 | 14.95 | 12.82 | 10.68 | 8.54  | 6.41  |
| $v_t$ [m/s]     | 3.04  | 3.21  | 3.39  | 3.58  | 3.80  | 4.03  | 4.29  | 4.57  | 4.87  | 5.20  |
| $v_3$ [m/s]     | 25.81 | 23.71 | 21.63 | 19.56 | 17.51 | 15.49 | 13.51 | 11.62 | 9.84  | 8.25  |
| $w_1$ [m/s]     | 27.13 | 25.13 | 23.14 | 21.18 | 19.27 | 17.40 | 15.60 | 13.90 | 12.34 | 10.97 |
| $w_3$ [m/s]     | 28.67 | 26.70 | 24.75 | 22.81 | 20.89 | 18.99 | 17.11 | 15.25 | 13.42 | 11.61 |
| $w_{inf}$ [m/s] | 28.19 | 26.21 | 24.26 | 22.34 | 20.44 | 18.58 | 16.76 | 15.01 | 13.33 | 11.76 |
| bet1[gr]        | 19.15 | 20.75 | 22.62 | 24.84 | 27.51 | 30.76 | 34.78 | 39.81 | 46.17 | 54.25 |
| bet3[gr]        | 12.26 | 13.13 | 14.13 | 15.28 | 16.61 | 18.17 | 20.01 | 22.22 | 24.91 | 28.22 |
| betinf[gr]      | 15.57 | 16.77 | 18.17 | 19.80 | 21.72 | 24.03 | 26.82 | 30.26 | 34.57 | 40.02 |
| alf3[gr]        | 116.0 | 117.2 | 118.5 | 119.9 | 121.4 | 122.9 | 124.6 | 126.3 | 128.0 | 129.9 |
| cyl/t[-]        | 0.22  | 0.24  | 0.28  | 0.32  | 0.37  | 0.43  | 0.51  | 0.61  | 0.73  | 0.88  |

\*\*\*\*\*

REZULTATE CORZI SI SOLIDITATI LA NR.DE PALETE 2,3,4,5

\*\*\*\*\*

| z | t [m] | l [m] | r (i) [m] |      |      |      |      |      |      |      |      |      |
|---|-------|-------|-----------|------|------|------|------|------|------|------|------|------|
|   |       |       | 2.40      | 2.20 | 2.00 | 1.80 | 1.60 | 1.40 | 1.20 | 1.00 | 0.80 | 0.60 |
| 2 | t2    |       | 7.54      | 6.91 | 6.28 | 5.65 | 5.03 | 4.40 | 3.77 | 3.14 | 2.51 | 1.88 |
|   |       | 12    | 1.02      | 1.06 | 1.10 | 1.13 | 1.17 | 1.19 | 1.21 | 1.20 | 1.15 | 1.04 |
| 3 | t3    |       | 5.03      | 4.61 | 4.19 | 3.77 | 3.35 | 2.93 | 2.51 | 2.09 | 1.68 | 1.26 |
|   |       | 13    | 0.68      | 0.70 | 0.73 | 0.76 | 0.78 | 0.80 | 0.80 | 0.80 | 0.77 | 0.69 |
| 4 | t4    |       | 3.77      | 3.46 | 3.14 | 2.83 | 2.51 | 2.20 | 1.88 | 1.57 | 1.26 | 0.94 |
|   |       | 14    | 0.51      | 0.53 | 0.55 | 0.57 | 0.58 | 0.60 | 0.60 | 0.60 | 0.57 | 0.52 |
| 5 | t5    |       | 3.02      | 2.76 | 2.51 | 2.26 | 2.01 | 1.76 | 1.51 | 1.26 | 1.01 | 0.75 |

```

15 0.41 0.42 0.44 0.45 0.47 0.48 0.48 0.48 0.46 0.42
*****
lm2[m]= 1.125551  lm3[m]= .7503676  lm4[m]= .5627757  lm5[m]= .4502206

```

```

Sol2= .2388438  Sol3= .2388438  Sol4= .2388438  Sol5= .2388438
*****

```

### Rezultatele din fișierul rcin2

REZULTATELE CALCULELOR CINEMATICE PENTRU TURBINA CU CODUL AFISAT

\*\*\*\*\*

programe,coduri,constante,dimensiuni:

PROGRAM MODNTURB.BAS REZULTATE IN WORD:rcin2

CONSTANTE:

D[m]: 5 , db[m]: 1 , Del r [m]: .2 , RO[kg/m3] : 1.225

uR[m/s]= 34.4 , V1[m/s] : 8.6 , V3a[m/s] 6.02 , VTa(m / s) = 7.31

GrD= .8 , LambD= 4 , kv3a= .7 , kvTa= .85

\*\*\*\*\*

Qtot[m3/s]= 137.7903 , Pt[W]= 11657.3 , Faxtot[N]= 1594.705

```

*****
r[m]      2.40  2.20  2.00  1.80  1.60  1.40  1.20  1.00  0.80  0.60
ur[m/s]   33.02 30.27 27.52 24.77 22.02 19.26 16.51 13.76 11.01  8.26
vt[m/s]   2.41  2.57  2.74  2.94  3.15  3.40  3.67  3.98  4.32  4.71
v3[m/s]   33.11 30.38 27.66 24.94 22.24 19.56 16.92 14.32 11.83  9.50
w1[m/s]   34.13 31.47 28.83 26.22 23.64 21.10 18.62 16.23 13.97 11.92
w3[m/s]   35.44 32.84 30.26 27.70 25.17 22.66 20.18 17.74 15.33 12.96
winf[m/s] 35.00 32.39 29.80 27.24 24.70 22.20 19.75 17.36 15.06 12.88
bet1[gr]  14.60 15.86 17.35 19.15 21.34 24.06 27.51 32.01 38.00 46.17
bet3[gr]   9.64 10.39 11.25 12.26 13.45 14.88 16.61 18.75 21.44 24.91
betinf[gr] 12.05 13.04 14.20 15.57 17.22 19.22 21.72 24.90 29.03 34.57
alf3[gr]  111.9 113.1 114.5 116.0 117.6 119.4 121.4 123.5 125.7 128.0
cyl/t[-]  0.14  0.16  0.18  0.22  0.26  0.31  0.37  0.46  0.57  0.73
*****

```

REZULTATE CORZI SI SOLIDITATI LA NR.DE PALETE 2,3,4,5

\*\*\*\*\*

```

z      t[m]  l[m]                r(i) [m]
          2.40  2.20  2.00  1.80  1.60  1.40  1.20  1.00  0.80  0.60

```

```

2      t2          7.54  6.91  6.28  5.65  5.03  4.40  3.77  3.14  2.51  1.88
          12  0.65  0.69  0.72  0.76  0.80  0.84  0.88  0.90  0.90  0.86
3      t3          5.03  4.61  4.19  3.77  3.35  2.93  2.51  2.09  1.68  1.26
          13  0.43  0.46  0.48  0.51  0.53  0.56  0.58  0.60  0.60  0.57
4      t4          3.77  3.46  3.14  2.83  2.51  2.20  1.88  1.57  1.26  0.94
          14  0.33  0.34  0.36  0.38  0.40  0.42  0.44  0.45  0.45  0.43
5      t5          3.02  2.76  2.51  2.26  2.01  1.76  1.51  1.26  1.01  0.75
          15  0.26  0.27  0.29  0.30  0.32  0.34  0.35  0.36  0.36  0.34

```

```

*****
lm2[m]= .8002312  lm3[m]= .5334874  lm4[m]= .4001156  lm5[m]= .3200925

```

```

Sol2= .1698103  Sol3= .1698103  Sol4= .1698103  Sol5= .1698103

```

\*\*\*\*\*

### Rezultatele din fișierul rcin3

REZULTATELE CALCULELOR CINEMATICE PENTRU TURBINA CU CODUL AFISAT

\*\*\*\*\*

programe,coduri,constante,dimensiuni:

PROGRAM MODNTURB.BAS REZULTATE IN WORD:rcin3

CONSTANTE:

D[m]: 5 , db[m]: 1 , Del r [m]: .2 , RO[kg/m3] : 1.225

uR[m/s]= 26.7 , V1[m/s] : 8.9 , V3a[m/s] 6.23 , VTa(m / s) = 7.565

GrD= .7 , LambD= 3 , kv3a= .7 , kvTa= .85  
 \*\*\*\*\*  
 Qtot[m3/s]= 142.5969 , Pt[W]= 8996.635 , Faxtot[N]= 1189.245

\*\*\*\*\*

|            |       |       |       |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| r[m]       | 2.40  | 2.20  | 2.00  | 1.80  | 1.60  | 1.40  | 1.20  | 1.00  | 0.80  | 0.60  |
| ur[m/s]    | 25.63 | 23.50 | 21.36 | 19.22 | 17.09 | 14.95 | 12.82 | 10.68 | 8.54  | 6.41  |
| vt[m/s]    | 2.29  | 2.44  | 2.62  | 2.82  | 3.04  | 3.29  | 3.58  | 3.91  | 4.29  | 4.72  |
| v3[m/s]    | 25.73 | 23.62 | 21.52 | 19.43 | 17.36 | 15.31 | 13.31 | 11.37 | 9.56  | 7.96  |
| w1[m/s]    | 27.13 | 25.13 | 23.14 | 21.18 | 19.27 | 17.40 | 15.60 | 13.90 | 12.34 | 10.97 |
| w3[m/s]    | 27.92 | 25.94 | 23.98 | 22.04 | 20.13 | 18.25 | 16.40 | 14.59 | 12.83 | 11.13 |
| winf[m/s]  | 27.82 | 25.85 | 23.90 | 21.97 | 20.09 | 18.24 | 16.45 | 14.73 | 13.10 | 11.58 |
| bet1[gr]   | 19.15 | 20.75 | 22.62 | 24.84 | 27.51 | 30.76 | 34.78 | 39.81 | 46.17 | 54.25 |
| bet3[gr]   | 12.58 | 13.51 | 14.56 | 15.78 | 17.20 | 18.85 | 20.80 | 23.12 | 25.89 | 29.25 |
| betinf[gr] | 15.78 | 17.02 | 18.45 | 20.14 | 22.12 | 24.50 | 27.38 | 30.91 | 35.29 | 40.79 |
| alf3[gr]   | 110.2 | 111.4 | 112.8 | 114.3 | 116.0 | 117.9 | 119.9 | 122.1 | 124.6 | 127.1 |
| cyl/t[-]   | 0.16  | 0.19  | 0.22  | 0.26  | 0.30  | 0.36  | 0.44  | 0.53  | 0.66  | 0.81  |

\*\*\*\*\*

REZULTATE CORZI SI SOLIDITATI LA NR.DE PALETE 2,3,4,5

\*\*\*\*\*

| z | t[m] | l[m] | r(i) [m] |      |      |      |      |      |      |      |      |      |
|---|------|------|----------|------|------|------|------|------|------|------|------|------|
|   |      |      | 2.40     | 2.20 | 2.00 | 1.80 | 1.60 | 1.40 | 1.20 | 1.00 | 0.80 | 0.60 |
| 2 | t2   |      | 7.54     | 6.91 | 6.28 | 5.65 | 5.03 | 4.40 | 3.77 | 3.14 | 2.51 | 1.88 |
|   |      | 12   | 0.77     | 0.82 | 0.86 | 0.91 | 0.95 | 0.99 | 1.03 | 1.04 | 1.03 | 0.96 |
| 3 | t3   |      | 5.03     | 4.61 | 4.19 | 3.77 | 3.35 | 2.93 | 2.51 | 2.09 | 1.68 | 1.26 |
|   |      | 13   | 0.52     | 0.54 | 0.57 | 0.60 | 0.63 | 0.66 | 0.68 | 0.70 | 0.69 | 0.64 |
| 4 | t4   |      | 3.77     | 3.46 | 3.14 | 2.83 | 2.51 | 2.20 | 1.88 | 1.57 | 1.26 | 0.94 |
|   |      | 14   | 0.39     | 0.41 | 0.43 | 0.45 | 0.48 | 0.50 | 0.51 | 0.52 | 0.51 | 0.48 |
| 5 | t5   |      | 3.02     | 2.76 | 2.51 | 2.26 | 2.01 | 1.76 | 1.51 | 1.26 | 1.01 | 0.75 |
|   |      | 15   | 0.31     | 0.33 | 0.34 | 0.36 | 0.38 | 0.40 | 0.41 | 0.42 | 0.41 | 0.38 |

\*\*\*\*\*

lm2[m]= .9359301    lm3[m]= .6239535    lm4[m]= .4679651    lm5[m]= .3743721

Sol2= .1986059    Sol3= .1986059    Sol4= .1986059    Sol5= .1986059

\*\*\*\*\*

**Rezultatele din fișierul rcin4**

REZULTATELE CALCULELOR CINEMATICE PENTRU TURBINA CU CODUL AFISAT

\*\*\*\*\*

programe,coduri,constante,dimensiuni:

PROGRAM MODNTURB.BAS    REZULTATE IN WORD:rcin4

CONSTANTE:

D[m]: 5 , db[m]: 1 , Del r [m]: .2 , RO[kg/m3] : 1.225

uR[m/s]= 34.4 , V1[m/s] : 8.6 , V3a[m/s] 6.02 , VTa(m / s) = 7.31

GrD= .7 , LambD= 4 , kv3a= .7 , kvTa= .85

\*\*\*\*\*

Qtot[m3/s]= 137.7903 , Pt[W]= 8856.984 , Faxtot[N]= 1211.626

\*\*\*\*\*

|            |       |       |       |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| r[m]       | 2.40  | 2.20  | 2.00  | 1.80  | 1.60  | 1.40  | 1.20  | 1.00  | 0.80  | 0.60  |
| ur[m/s]    | 33.02 | 30.27 | 27.52 | 24.77 | 22.02 | 19.26 | 16.51 | 13.76 | 11.01 | 8.26  |
| vt[m/s]    | 1.75  | 1.88  | 2.03  | 2.21  | 2.41  | 2.65  | 2.94  | 3.27  | 3.67  | 4.15  |
| v3[m/s]    | 33.07 | 30.33 | 27.60 | 24.87 | 22.15 | 19.45 | 16.77 | 14.14 | 11.60 | 9.24  |
| w1[m/s]    | 34.13 | 31.47 | 28.83 | 26.22 | 23.64 | 21.10 | 18.62 | 16.23 | 13.97 | 11.92 |
| w3[m/s]    | 34.77 | 32.15 | 29.55 | 26.98 | 24.43 | 21.92 | 19.45 | 17.03 | 14.68 | 12.40 |
| winf[m/s]  | 34.68 | 32.06 | 29.46 | 26.89 | 24.35 | 21.85 | 19.41 | 17.04 | 14.78 | 12.65 |
| bet1[gr]   | 14.60 | 15.86 | 17.35 | 19.15 | 21.34 | 24.06 | 27.51 | 32.01 | 38.00 | 46.17 |
| bet3[gr]   | 9.82  | 10.60 | 11.51 | 12.58 | 13.84 | 15.36 | 17.20 | 19.47 | 22.30 | 25.89 |
| betinf[gr] | 12.17 | 13.18 | 14.37 | 15.78 | 17.47 | 19.55 | 22.12 | 25.40 | 29.65 | 35.29 |
| alf3[gr]   | 106.2 | 107.4 | 108.7 | 110.2 | 111.9 | 113.8 | 116.0 | 118.5 | 121.4 | 124.6 |

```

cyl/t[-]    0.10   0.12   0.14   0.16   0.20   0.24   0.30   0.38   0.50   0.66
*****
REZULTATE CORZI SI SOLIDITATI LA NR.DE PALETE 2,3,4,5
*****
z   t[m]   l[m]                r(i) [m]
      2.40  2.20  2.00  1.80  1.60  1.40  1.20  1.00  0.80  0.60
-----
2   t2           7.54  6.91  6.28  5.65  5.03  4.40  3.77  3.14  2.51  1.88
      12  0.48  0.51  0.54  0.58  0.62  0.67  0.71  0.75  0.78  0.77
3   t3           5.03  4.61  4.19  3.77  3.35  2.93  2.51  2.09  1.68  1.26
      13  0.32  0.34  0.36  0.39  0.42  0.45  0.48  0.50  0.52  0.51
4   t4           3.77  3.46  3.14  2.83  2.51  2.20  1.88  1.57  1.26  0.94
      14  0.24  0.25  0.27  0.29  0.31  0.33  0.36  0.38  0.39  0.39
5   t5           3.02  2.76  2.51  2.26  2.01  1.76  1.51  1.26  1.01  0.75
      15  0.19  0.20  0.22  0.23  0.25  0.27  0.29  0.30  0.31  0.31
*****
lm2[m]= .6415742  lm3[m]= .4277161  lm4[m]= .3207871  lm5[m]= .2566296
-----
Sol2= .1361431  Sol3= .1361431  Sol4= .1361431  Sol5= .136143
-----

```

### Rezultatele din fișierul rcin5

```

REZULTATELE CALCULELOR CINEMATICE PENTRU TURBINA CU CODUL AFISAT
*****
programe,coduri,constante,dimensiuni:
PROGRAM MODNTURB.BAS  REZULTATE IN WORD:rcin5
CONSTANTE:
D[m]: 4.5 , db[m]: .9 , Del r [m]: .18 , RO[kg/m3] : 1.225
uR[m/s]= 28.8 ,V1[m/s] : 9.6 , V3a[m/s] 6.72 , VTa(m / s) = 8.160001
GrD= .8 , LambD= 3 , kv3a= .7 , kvTa= .85
*****
Qtot[m3/s]= 124.5881 ,Pt[W]= 11573.65 ,Faxtot[N]= 1418.339
-----
r[m]      2.16  1.98  1.80  1.62  1.44  1.26  1.08  0.90  0.72  0.54
ur[m/s]   27.65 25.34 23.04 20.74 18.43 16.13 13.82 11.52 9.22 6.91
vt[m/s]    3.28  3.46  3.65  3.87  4.10  4.35  4.63  4.93  5.26  5.61
v3[m/s]    27.84 25.58 23.33 21.09 18.88 16.70 14.58 12.53 10.61 8.90
w1[m/s]    29.27 27.10 24.96 22.85 20.78 18.77 16.83 15.00 13.31 11.83
w3[m/s]    30.93 28.80 26.69 24.60 22.53 20.48 18.45 16.45 14.47 12.52
winf[m/s]  30.40 28.28 26.17 24.09 22.05 20.04 18.08 16.19 14.38 12.69
bet1[gr]   19.15 20.75 22.62 24.84 27.51 30.76 34.78 39.81 46.17 54.25
bet3[gr]   12.26 13.13 14.13 15.28 16.61 18.17 20.01 22.22 24.91 28.22
betinf[gr] 15.57 16.77 18.17 19.80 21.72 24.03 26.82 30.26 34.57 40.02
alf3[gr]   116.0 117.2 118.5 119.9 121.4 122.9 124.6 126.3 128.0 129.9
cyl/t[-]   0.22  0.24  0.28  0.32  0.37  0.43  0.51  0.61  0.73  0.88
*****
REZULTATE CORZI SI SOLIDITATI LA NR.DE PALETE 2,3,4,5
*****
z   t[m]   l[m]                r(i) [m]
      2.16  1.98  1.80  1.62  1.44  1.26  1.08  0.90  0.72  0.54
-----
2   t2           6.79  6.22  5.65  5.09  4.52  3.96  3.39  2.83  2.26  1.70
      12  0.91  0.95  0.99  1.02  1.05  1.07  1.09  1.08  1.03  0.94
3   t3           4.52  4.15  3.77  3.39  3.02  2.64  2.26  1.88  1.51  1.13
      13  0.61  0.63  0.66  0.68  0.70  0.72  0.72  0.72  0.69  0.63
4   t4           3.39  3.11  2.83  2.54  2.26  1.98  1.70  1.41  1.13  0.85
      14  0.46  0.48  0.49  0.51  0.53  0.54  0.54  0.54  0.52  0.47
5   t5           2.71  2.49  2.26  2.04  1.81  1.58  1.36  1.13  0.90  0.68
      15  0.37  0.38  0.39  0.41  0.42  0.43  0.43  0.43  0.41  0.38
*****
lm2[m]= 1.012997  lm3[m]= .6753311  lm4[m]= .5064983  lm5[m]= .4051986
-----

```



---

Sol2= .2388439 Sol3= .2388439 Sol4= .2388439 Sol5= .2388439  
 \*\*\*\*\*

### Rezultatele din fișierul rcin6

REZULTATELE CALCULELOR CINEMATICE PENTRU TURBINA CU CODUL AFISAT

\*\*\*\*\*

programe,coduri,constante,dimensiuni:

PROGRAM MODNTURB.BAS REZULTATE IN WORD:rcin6

CONSTANTE:

D[m]: 4.5 , db[m]: .9 , Del r [m]: .18 , RO[kg/m3] : 1.225

uR[m/s]= 37.6 ,V1[m/s] : 9.4 , V3a[m/s] 6.579999 , VTa(m / s) = 7.99

GrD= .8 , LambD= 4 , kv3a= .7 , kvTa= .85

\*\*\*\*\*

Qtot[m3/s]= 121.9925 ,Pt[W]= 12330.23 ,Faxtot[N]= 1543.208

---

\*\*\*\*\*

|            |       |       |       |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| r[m]       | 2.16  | 1.98  | 1.80  | 1.62  | 1.44  | 1.26  | 1.08  | 0.90  | 0.72  | 0.54  |
| ur[m/s]    | 36.10 | 33.09 | 30.08 | 27.07 | 24.06 | 21.06 | 18.05 | 15.04 | 12.03 | 9.02  |
| vt[m/s]    | 2.64  | 2.81  | 3.00  | 3.21  | 3.45  | 3.71  | 4.01  | 4.35  | 4.72  | 5.15  |
| v3[m/s]    | 36.19 | 33.21 | 30.23 | 27.26 | 24.31 | 21.38 | 18.49 | 15.66 | 12.93 | 10.39 |
| w1[m/s]    | 37.30 | 34.40 | 31.51 | 28.66 | 25.83 | 23.06 | 20.35 | 17.74 | 15.27 | 13.03 |
| w3[m/s]    | 38.73 | 35.90 | 33.08 | 30.28 | 27.51 | 24.77 | 22.06 | 19.39 | 16.76 | 14.17 |
| winf[m/s]  | 38.26 | 35.41 | 32.57 | 29.77 | 27.00 | 24.27 | 21.59 | 18.98 | 16.46 | 14.08 |
| bet1[gr]   | 14.60 | 15.86 | 17.35 | 19.15 | 21.34 | 24.06 | 27.51 | 32.01 | 38.00 | 46.17 |
| bet3[gr]   | 9.64  | 10.39 | 11.25 | 12.26 | 13.45 | 14.88 | 16.61 | 18.75 | 21.44 | 24.91 |
| betinf[gr] | 12.05 | 13.04 | 14.20 | 15.57 | 17.22 | 19.22 | 21.72 | 24.90 | 29.03 | 34.57 |
| alf3[gr]   | 111.9 | 113.1 | 114.5 | 116.0 | 117.6 | 119.4 | 121.4 | 123.5 | 125.7 | 128.0 |
| cyl/t[-]   | 0.14  | 0.16  | 0.18  | 0.22  | 0.26  | 0.31  | 0.37  | 0.46  | 0.57  | 0.73  |

\*\*\*\*\*

REZULTATE CORZI SI SOLIDITATI LA NR.DE PALETE 2,3,4,5

\*\*\*\*\*

| z | t[m] | l[m] | r(i) [m] |      |      |      |      |      |      |      |      |      |
|---|------|------|----------|------|------|------|------|------|------|------|------|------|
|   |      |      | 2.16     | 1.98 | 1.80 | 1.62 | 1.44 | 1.26 | 1.08 | 0.90 | 0.72 | 0.54 |
| 2 | t2   |      | 6.79     | 6.22 | 5.65 | 5.09 | 4.52 | 3.96 | 3.39 | 2.83 | 2.26 | 1.70 |
|   |      | 12   | 0.59     | 0.62 | 0.65 | 0.69 | 0.72 | 0.76 | 0.79 | 0.81 | 0.81 | 0.77 |
| 3 | t3   |      | 4.52     | 4.15 | 3.77 | 3.39 | 3.02 | 2.64 | 2.26 | 1.88 | 1.51 | 1.13 |
|   |      | 13   | 0.39     | 0.41 | 0.43 | 0.46 | 0.48 | 0.50 | 0.53 | 0.54 | 0.54 | 0.52 |
| 4 | t4   |      | 3.39     | 3.11 | 2.83 | 2.54 | 2.26 | 1.98 | 1.70 | 1.41 | 1.13 | 0.85 |
|   |      | 14   | 0.29     | 0.31 | 0.33 | 0.34 | 0.36 | 0.38 | 0.39 | 0.40 | 0.41 | 0.39 |
| 5 | t5   |      | 2.71     | 2.49 | 2.26 | 2.04 | 1.81 | 1.58 | 1.36 | 1.13 | 0.90 | 0.68 |
|   |      | 15   | 0.23     | 0.25 | 0.26 | 0.27 | 0.29 | 0.30 | 0.32 | 0.32 | 0.32 | 0.31 |

\*\*\*\*\*

lm2[m]= .720208 lm3[m]= .4801386 lm4[m]= .360104 lm5[m]= .2880832

---

Sol2= .1698103 Sol3= .1698103 Sol4= .1698103 Sol5= .1698103

\*\*\*\*\*

### Rezultatele din fișierul rcin7

REZULTATELE CALCULELOR CINEMATICE PENTRU TURBINA CU CODUL AFISAT

\*\*\*\*\*

programe,coduri,constante,dimensiuni:

PROGRAM MODNTURB.BAS REZULTATE IN WORD:rcin7

CONSTANTE:

D[m]: 4.5 , db[m]: .9 , Del r [m]: .18 , RO[kg/m3] : 1.225

uR[m/s]= 28.8 ,V1[m/s] : 9.6 , V3a[m/s] 6.72 , VTa(m / s) = 8.160001

GrD= .7 , LambD= 3 , kv3a= .7 , kvTa= .85

\*\*\*\*\*

Qtot[m3/s]= 124.5881 ,Pt[W]= 9145.531 ,Faxtot[N]= 1120.776

---

```
*****
r[m]      2.16  1.98  1.80  1.62  1.44  1.26  1.08  0.90  0.72  0.54
ur[m/s]   27.65 25.34 23.04 20.74 18.43 16.13 13.82 11.52 9.22 6.91
vt[m/s]   2.47  2.63  2.82  3.04  3.28  3.55  3.87  4.22  4.63  5.09
v3[m/s]   27.76 25.48 23.21 20.96 18.72 16.51 14.35 12.27 10.31 8.58
w1[m/s]   29.27 27.10 24.96 22.85 20.78 18.77 16.83 15.00 13.31 11.83
w3[m/s]   30.11 27.98 25.86 23.77 21.71 19.68 17.69 15.74 13.84 12.00
winf[m/s] 30.01 27.88 25.78 23.70 21.67 19.68 17.74 15.89 14.13 12.49
bet1[gr]  19.15 20.75 22.62 24.84 27.51 30.76 34.78 39.81 46.17 54.25
bet3[gr]  12.58 13.51 14.56 15.78 17.20 18.85 20.80 23.12 25.89 29.25
betinf[gr] 15.78 17.02 18.45 20.14 22.12 24.50 27.38 30.91 35.29 40.79
alf3[gr]  110.2 111.4 112.8 114.3 116.0 117.9 119.9 122.1 124.6 127.1
cyl/t[-]  0.16  0.19  0.22  0.26  0.30  0.36  0.44  0.53  0.66  0.81
*****
```

REZULTATE CORZI SI SOLIDITATI LA NR.DE PALETE 2,3,4,5

```
*****
z   t[m]   l[m]                r(i) [m]
      2.16  1.98  1.80  1.62  1.44  1.26  1.08  0.90  0.72  0.54
-----
2   t2      6.79  6.22  5.65  5.09  4.52  3.96  3.39  2.83  2.26  1.70
      12   0.70  0.73  0.77  0.82  0.86  0.89  0.92  0.94  0.93  0.86
3   t3      4.52  4.15  3.77  3.39  3.02  2.64  2.26  1.88  1.51  1.13
      13   0.46  0.49  0.52  0.54  0.57  0.60  0.62  0.63  0.62  0.58
4   t4      3.39  3.11  2.83  2.54  2.26  1.98  1.70  1.41  1.13  0.85
      14   0.35  0.37  0.39  0.41  0.43  0.45  0.46  0.47  0.46  0.43
5   t5      2.71  2.49  2.26  2.04  1.81  1.58  1.36  1.13  0.90  0.68
      15   0.28  0.29  0.31  0.33  0.34  0.36  0.37  0.38  0.37  0.35
*****
lm2[m]= .8423373  lm3[m]= .5615582  lm4[m]= .4211687  lm5[m]= .336935
```

Sol2= .1986059 Sol3= .1986059 Sol4= .1986059 Sol5= .1986059

\*\*\*\*\*

## Rezultatele din fișierul rcin8

REZULTATELE CALCULELOR CINEMATICE PENTRU TURBINA CU CODUL AFISAT

\*\*\*\*\*

programe,coduri,constante,dimensiuni:

PROGRAM MODNTURB.BAS REZULTATE IN WORD:rcin8

CONSTANTE:

D[m]: 4.5 , db[m]: .9 , Del r [m]: .18 , RO[kg/m3] : 1.225

uR[m/s]= 37.6 ,V1[m/s] : 9.4 , V3a[m/s] 6.579999 , VTa(m / s) = 7.99

GrD= .7 , LambD= 4 , kv3a= .7 , kvTa= .85

\*\*\*\*\*

Qtot[m3/s]= 121.9925 ,Pt[W]= 9368.264 ,Faxtot[N]= 1172.499

```
*****
r[m]      2.16  1.98  1.80  1.62  1.44  1.26  1.08  0.90  0.72  0.54
ur[m/s]   36.10 33.09 30.08 27.07 24.06 21.06 18.05 15.04 12.03 9.02
vt[m/s]   1.91  2.06  2.22  2.42  2.64  2.90  3.21  3.58  4.01  4.53
v3[m/s]   36.15 33.15 30.16 27.18 24.21 21.25 18.33 15.46 12.68 10.10
w1[m/s]   37.30 34.40 31.51 28.66 25.83 23.06 20.35 17.74 15.27 13.03
w3[m/s]   38.01 35.14 32.30 29.49 26.70 23.96 21.26 18.62 16.04 13.56
winf[m/s] 37.90 35.04 32.20 29.39 26.61 23.88 21.22 18.63 16.15 13.83
bet1[gr]  14.60 15.86 17.35 19.15 21.34 24.06 27.51 32.01 38.00 46.17
bet3[gr]   9.82 10.60 11.51 12.58 13.84 15.36 17.20 19.47 22.30 25.89
betinf[gr] 12.17 13.18 14.37 15.78 17.47 19.55 22.12 25.40 29.65 35.29
alf3[gr]  106.2 107.4 108.7 110.2 111.9 113.8 116.0 118.5 121.4 124.6
cyl/t[-]  0.10  0.12  0.14  0.16  0.20  0.24  0.30  0.38  0.50  0.66
*****
```

REZULTATE CORZI SI SOLIDITATI LA NR.DE PALETE 2,3,4,5

\*\*\*\*\*

| z | t [m] | l [m] | r (i) [m] |      |      |      |      |      |      |      |      |      |
|---|-------|-------|-----------|------|------|------|------|------|------|------|------|------|
|   |       |       | 2.16      | 1.98 | 1.80 | 1.62 | 1.44 | 1.26 | 1.08 | 0.90 | 0.72 | 0.54 |
| 2 | t2    |       | 6.79      | 6.22 | 5.65 | 5.09 | 4.52 | 3.96 | 3.39 | 2.83 | 2.26 | 1.70 |
|   |       | 12    | 0.43      | 0.46 | 0.49 | 0.52 | 0.56 | 0.60 | 0.64 | 0.68 | 0.70 | 0.69 |
| 3 | t3    |       | 4.52      | 4.15 | 3.77 | 3.39 | 3.02 | 2.64 | 2.26 | 1.88 | 1.51 | 1.13 |
|   |       | 13    | 0.29      | 0.30 | 0.33 | 0.35 | 0.37 | 0.40 | 0.43 | 0.45 | 0.47 | 0.46 |
| 4 | t4    |       | 3.39      | 3.11 | 2.83 | 2.54 | 2.26 | 1.98 | 1.70 | 1.41 | 1.13 | 0.85 |
|   |       | 14    | 0.21      | 0.23 | 0.24 | 0.26 | 0.28 | 0.30 | 0.32 | 0.34 | 0.35 | 0.35 |
| 5 | t5    |       | 2.71      | 2.49 | 2.26 | 2.04 | 1.81 | 1.58 | 1.36 | 1.13 | 0.90 | 0.68 |
|   |       | 15    | 0.17      | 0.18 | 0.20 | 0.21 | 0.22 | 0.24 | 0.26 | 0.27 | 0.28 | 0.28 |

\*\*\*\*\*  
lm2 [m]= .5774167 lm3 [m]= .3849444 lm4 [m]= .2887083 lm5 [m]= .2309667  
\*\*\*\*\*  
Sol2= .136143 Sol3= .136143 Sol4= .136143 Sol5= .136143  
\*\*\*\*\*

### 3.5. Programul GNACA4G

#### 3.5.1. Programul GNACA4G.BAS

```

REM programul GNACA4g calculeaza functia de grosime pentru
REM familia de profile Naca cu patru cifre.
REM completari cu functia schelet pentru NACAxxxx
REM se accepta aproximatia pentru contur yc=ys+-y
REM marimi de intrare: coarda l,grosimea max.relative drel
CLS
INPUT "r[m]= "; r
INPUT "beta="; beta
INPUT "l[mm]="; l
INPUT "sageata maxima relativa:"; ysmax
INPUT "    drel [-]="; drel
LET rArel = 1.1019 * drel ^ 2
LET rFrel = .105 * drel ^ 2
rA = rArel * l: rF = rFrel * l
Delx = 10: imax = l / Delx + 1
DIM ys(imax)
DIM ycs(imax)
DIM yci(imax)
DIM x(imax)
DIM y(imax)
PRINT "    n$=RNACAj valori pentru j 1,2,3,..."
PRINT " la scara 1/5 n$=rnac5j"
INPUT "    n$="; n$
PRINT "    n$=    "; n$
OPEN n$ FOR OUTPUT AS #1
FOR i = 1 TO imax
x = Delx * (i - 1)
xrel = x / l
yrel = drel * (1.4845 *SQR(xrel) - .63 * xrel - 1.758 *xrel ^ 2 + 1.4215 *xrel
^ 3 - .5075 * xrel ^ 4)
y = yrel * l
x(i) = x: y(i) = y
IF xrel <= .4 THEN LET ysrel = ysmax / .4 ^ 2 * (.8 * xrel - xrel ^ 2)
IF xrel > .4 THEN LET ysrel = ysmax / (1 - .4) ^ 2 * ((1 - .8) + .8 * xrel -
xrel ^ 2)
ys(i) = ysrel * l
ycs(i) = ys(i) + y(i)
yci(i) = ys(i) - y(i)

```

```

NEXT i
CLS
PRINT #1, "PROGRAM GNACA4G ;FISIER DE REZULTATE RNACAj"
PRINT #1, "REZULTATELE FUNCTIEI DE GROSIME, A FUNCTIEI DE SCHELET PENTRU
CONTUR NACA4"
PRINT #1, "Positionarea profilului r[m]= "; r
PRINT #1, "Unghiul de instalare [gr]= "; bet
PRINT #1, "l[mm]="; l, "drel ="; drel, "ysmax ="; ysmax
PRINT ""
PRINT #1, "rA[mm]="; rA, "rF[mm]="; rF
PRINT #1,
"*****"
PRINT #1, "x[mm]      y[mm]+-      ys (mm)      ycs (mm)      yci (mm)      "
PRINT #1, "*****"
FOR i = 1 TO imax
PRINT #1, USING "####.##  "; x(i); y(i); ys(i); ycs(i); yci(i)
NEXT i
CLOSE
END

```

### 3.5.2. Rezultate ale programului GNACA4G

#### Rezultatele din fișierul RNACA1

```

PROGRAM GNACA4G ;FISIER DE REZULTATE RNACA1
REZULTATELE FUNCTIEI DE GROSIME, A FUNCTIEI DE SCHELET SI CONTUR NACA4
Positionarea profilului r[m]= .8
l[mm]= 361      drel = .236      ysmax = .04
rA[mm]= 22.15508      rF[mm]= 2.111157
*****
x[mm]      y[mm]+-      ys (mm)      ycs (mm)      yci (mm)
*****
  0.00      0.00      0.00      0.00      0.00
  5.00      14.11      0.98      15.10      -13.13
 10.00      19.45      1.93      21.38      -17.52
 15.00      23.30      2.84      26.14      -20.46
 20.00      26.36      3.72      30.08      -22.63
 25.00      28.89      4.57      33.45      -24.32
 30.00      31.03      5.38      36.41      -25.66
 35.00      32.88      6.15      39.03      -26.72
 40.00      34.47      6.89      41.36      -27.58
 45.00      35.86      7.60      43.46      -28.26
 50.00      37.07      8.27      45.34      -28.80
 55.00      38.12      8.91      47.02      -29.21
 60.00      39.03      9.51      48.53      -29.52
 65.00      39.81      10.07     49.88      -29.73
 70.00      40.48      10.61     51.08      -29.87
 75.00      41.04      11.10     52.14      -29.93
 80.00      41.50      11.57     53.07      -29.93
 85.00      41.88      12.00     53.87      -29.88
 90.00      42.17      12.39     54.56      -29.78
 95.00      42.38      12.75     55.13      -29.63
100.00     42.52      13.07     55.60      -29.45
105.00     42.60      13.36     55.96      -29.23
110.00     42.61      13.62     56.23      -28.99
115.00     42.56      13.84     56.40      -28.71
120.00     42.45      14.03     56.48      -28.42
125.00     42.29      14.18     56.47      -28.11
130.00     42.07      14.30     56.37      -27.78
135.00     41.81      14.38     56.19      -27.43

```

|        |       |       |       |        |
|--------|-------|-------|-------|--------|
| 140.00 | 41.51 | 14.43 | 55.93 | -27.08 |
| 145.00 | 41.16 | 14.44 | 55.60 | -26.72 |
| 150.00 | 40.76 | 14.43 | 55.19 | -26.33 |
| 155.00 | 40.33 | 14.41 | 54.74 | -25.93 |
| 160.00 | 39.86 | 14.37 | 54.23 | -25.50 |
| 165.00 | 39.36 | 14.31 | 53.67 | -25.05 |
| 170.00 | 38.82 | 14.24 | 53.06 | -24.58 |
| 175.00 | 38.25 | 14.15 | 52.40 | -24.10 |
| 180.00 | 37.65 | 14.05 | 51.70 | -23.60 |
| 185.00 | 37.02 | 13.93 | 50.95 | -23.08 |
| 190.00 | 36.35 | 13.80 | 50.15 | -22.55 |
| 195.00 | 35.67 | 13.65 | 49.32 | -22.01 |
| 200.00 | 34.95 | 13.49 | 48.44 | -21.46 |
| 205.00 | 34.21 | 13.31 | 47.52 | -20.90 |
| 210.00 | 33.44 | 13.12 | 46.56 | -20.33 |
| 215.00 | 32.66 | 12.91 | 45.56 | -19.75 |
| 220.00 | 31.84 | 12.68 | 44.52 | -19.16 |
| 225.00 | 31.01 | 12.44 | 43.45 | -18.57 |
| 230.00 | 30.15 | 12.18 | 42.34 | -17.97 |
| 235.00 | 29.28 | 11.91 | 41.19 | -17.36 |
| 240.00 | 28.38 | 11.63 | 40.01 | -16.75 |
| 245.00 | 27.46 | 11.33 | 38.79 | -16.14 |
| 250.00 | 26.53 | 11.01 | 37.53 | -15.52 |
| 255.00 | 25.57 | 10.68 | 36.25 | -14.90 |
| 260.00 | 24.60 | 10.33 | 34.92 | -14.27 |
| 265.00 | 23.60 | 9.96  | 33.57 | -13.64 |
| 270.00 | 22.59 | 9.58  | 32.18 | -13.01 |
| 275.00 | 21.56 | 9.19  | 30.75 | -12.37 |
| 280.00 | 20.51 | 8.78  | 29.29 | -11.73 |
| 285.00 | 19.45 | 8.36  | 27.80 | -11.09 |
| 290.00 | 18.36 | 7.92  | 26.28 | -10.45 |
| 295.00 | 17.26 | 7.46  | 24.72 | -9.80  |
| 300.00 | 16.14 | 6.99  | 23.13 | -9.15  |
| 305.00 | 15.00 | 6.50  | 21.50 | -8.50  |
| 310.00 | 13.84 | 6.00  | 19.84 | -7.84  |
| 315.00 | 12.66 | 5.48  | 18.15 | -7.18  |
| 320.00 | 11.47 | 4.95  | 16.42 | -6.52  |
| 325.00 | 10.25 | 4.40  | 14.65 | -5.85  |
| 330.00 | 9.02  | 3.84  | 12.86 | -5.18  |
| 335.00 | 7.76  | 3.26  | 11.02 | -4.51  |
| 340.00 | 6.49  | 2.66  | 9.15  | -3.82  |
| 345.00 | 5.19  | 2.05  | 7.25  | -3.14  |
| 350.00 | 3.87  | 1.43  | 5.30  | -2.44  |
| 355.00 | 2.53  | 0.79  | 3.32  | -1.74  |
| 360.00 | 1.17  | 0.13  | 1.30  | -1.04  |

### Rezultatele din fișierul RNACA2

PROGRAM GNACA4G ;FISIER DE REZULTATE RNACA2

REZULTATELE FUNCTIEI DE GROSIME, A FUNCTIEI DE SCHELET SI CONTUR NACA4

Positionarea profilului r[m]= 1

l[mm]= 339 drel = .22 ysmax = .04

rA[mm]= 18.07953 rF[mm]= 1.722798

\*\*\*\*\*

| x[mm] | y[mm]+- | ys (mm) | ycs (mm) | yci (mm) |
|-------|---------|---------|----------|----------|
|-------|---------|---------|----------|----------|

\*\*\*\*\*

|       |       |      |       |        |
|-------|-------|------|-------|--------|
| 0.00  | 0.00  | 0.00 | 0.00  | 0.00   |
| 5.00  | 12.72 | 0.98 | 13.71 | -11.74 |
| 10.00 | 17.52 | 1.93 | 19.44 | -15.59 |
| 15.00 | 20.96 | 2.83 | 23.80 | -18.13 |
| 20.00 | 23.68 | 3.71 | 27.39 | -19.98 |
| 25.00 | 25.93 | 4.54 | 30.47 | -21.39 |

|        |       |       |       |        |
|--------|-------|-------|-------|--------|
| 30.00  | 27.82 | 5.34  | 33.16 | -22.49 |
| 35.00  | 29.44 | 6.10  | 35.53 | -23.34 |
| 40.00  | 30.83 | 6.82  | 37.65 | -24.01 |
| 45.00  | 32.03 | 7.51  | 39.53 | -24.52 |
| 50.00  | 33.06 | 8.16  | 41.22 | -24.90 |
| 55.00  | 33.95 | 8.77  | 42.72 | -25.18 |
| 60.00  | 34.71 | 9.35  | 44.05 | -25.36 |
| 65.00  | 35.35 | 9.88  | 45.23 | -25.46 |
| 70.00  | 35.88 | 10.39 | 46.27 | -25.50 |
| 75.00  | 36.32 | 10.85 | 47.17 | -25.47 |
| 80.00  | 36.67 | 11.28 | 47.95 | -25.39 |
| 85.00  | 36.94 | 11.67 | 48.61 | -25.26 |
| 90.00  | 37.13 | 12.03 | 49.15 | -25.10 |
| 95.00  | 37.25 | 12.34 | 49.59 | -24.90 |
| 100.00 | 37.30 | 12.63 | 49.92 | -24.67 |
| 105.00 | 37.29 | 12.87 | 50.16 | -24.42 |
| 110.00 | 37.22 | 13.08 | 50.29 | -24.14 |
| 115.00 | 37.09 | 13.25 | 50.34 | -23.85 |
| 120.00 | 36.92 | 13.38 | 50.30 | -23.54 |
| 125.00 | 36.69 | 13.48 | 50.17 | -23.22 |
| 130.00 | 36.42 | 13.54 | 49.96 | -22.88 |
| 135.00 | 36.11 | 13.56 | 49.67 | -22.55 |
| 140.00 | 35.75 | 13.55 | 49.30 | -22.20 |
| 145.00 | 35.35 | 13.53 | 48.88 | -21.82 |
| 150.00 | 34.92 | 13.49 | 48.41 | -21.43 |
| 155.00 | 34.45 | 13.44 | 47.89 | -21.01 |
| 160.00 | 33.95 | 13.36 | 47.31 | -20.58 |
| 165.00 | 33.41 | 13.28 | 46.69 | -20.13 |
| 170.00 | 32.84 | 13.17 | 46.02 | -19.67 |
| 175.00 | 32.25 | 13.05 | 45.30 | -19.20 |
| 180.00 | 31.62 | 12.91 | 44.54 | -18.71 |
| 185.00 | 30.97 | 12.76 | 43.73 | -18.21 |
| 190.00 | 30.30 | 12.59 | 42.89 | -17.71 |
| 195.00 | 29.59 | 12.40 | 42.00 | -17.19 |
| 200.00 | 28.87 | 12.20 | 41.07 | -16.67 |
| 205.00 | 28.12 | 11.98 | 40.10 | -16.14 |
| 210.00 | 27.35 | 11.75 | 39.09 | -15.60 |
| 215.00 | 26.56 | 11.49 | 38.05 | -15.06 |
| 220.00 | 25.74 | 11.23 | 36.97 | -14.52 |
| 225.00 | 24.91 | 10.94 | 35.85 | -13.97 |
| 230.00 | 24.05 | 10.64 | 34.69 | -13.41 |
| 235.00 | 23.18 | 10.32 | 33.50 | -12.86 |
| 240.00 | 22.29 | 9.99  | 32.27 | -12.30 |
| 245.00 | 21.38 | 9.64  | 31.01 | -11.74 |
| 250.00 | 20.45 | 9.27  | 29.72 | -11.18 |
| 255.00 | 19.50 | 8.89  | 28.39 | -10.61 |
| 260.00 | 18.53 | 8.49  | 27.02 | -10.04 |
| 265.00 | 17.55 | 8.07  | 25.62 | -9.48  |
| 270.00 | 16.55 | 7.64  | 24.19 | -8.91  |
| 275.00 | 15.53 | 7.19  | 22.72 | -8.34  |
| 280.00 | 14.49 | 6.73  | 21.21 | -7.76  |
| 285.00 | 13.43 | 6.24  | 19.68 | -7.19  |
| 290.00 | 12.36 | 5.75  | 18.10 | -6.61  |
| 295.00 | 11.26 | 5.23  | 16.50 | -6.03  |
| 300.00 | 10.15 | 4.70  | 14.85 | -5.45  |
| 305.00 | 9.02  | 4.15  | 13.17 | -4.87  |
| 310.00 | 7.87  | 3.59  | 11.46 | -4.28  |
| 315.00 | 6.70  | 3.01  | 9.71  | -3.69  |
| 320.00 | 5.51  | 2.42  | 7.92  | -3.09  |
| 325.00 | 4.29  | 1.80  | 6.10  | -2.49  |
| 330.00 | 3.06  | 1.17  | 4.23  | -1.89  |

335.00      1.80      0.53      2.33      -1.28

### Rezultatele din fișierul RNACA3

PROGRAM GNACA4G ;FISIER DE REZULTATE RNACA3

REZULTATELE FUNCTIEI DE GROSIME, A FUNCTIEI DE SCHELET SI CONTUR NACA4

Pozitionarea profilului r[m]= 1.2

l[mm]= 317      drel = .204      ysmax = .04

rA[mm]= 14.53656      rF[mm]= 1.385188

\*\*\*\*\*

| x[mm]  | y[mm]+- | ys (mm) | ycs (mm) | yci (mm) |
|--------|---------|---------|----------|----------|
| 0.00   | 0.00    | 0.00    | 0.00     | 0.00     |
| 5.00   | 11.39   | 0.98    | 12.37    | -10.41   |
| 10.00  | 15.66   | 1.92    | 17.58    | -13.73   |
| 15.00  | 18.71   | 2.82    | 21.53    | -15.89   |
| 20.00  | 21.11   | 3.68    | 24.80    | -17.43   |
| 25.00  | 23.08   | 4.51    | 27.59    | -18.58   |
| 30.00  | 24.73   | 5.29    | 30.02    | -19.44   |
| 35.00  | 26.13   | 6.03    | 32.17    | -20.10   |
| 40.00  | 27.33   | 6.74    | 34.06    | -20.59   |
| 45.00  | 28.35   | 7.40    | 35.75    | -20.94   |
| 50.00  | 29.21   | 8.03    | 37.24    | -21.18   |
| 55.00  | 29.95   | 8.61    | 38.56    | -21.33   |
| 60.00  | 30.56   | 9.16    | 39.72    | -21.40   |
| 65.00  | 31.07   | 9.67    | 40.74    | -21.40   |
| 70.00  | 31.48   | 10.14   | 41.62    | -21.35   |
| 75.00  | 31.81   | 10.56   | 42.37    | -21.24   |
| 80.00  | 32.05   | 10.95   | 43.00    | -21.10   |
| 85.00  | 32.22   | 11.30   | 43.52    | -20.91   |
| 90.00  | 32.31   | 11.61   | 43.92    | -20.70   |
| 95.00  | 32.34   | 11.88   | 44.23    | -20.46   |
| 100.00 | 32.31   | 12.11   | 44.43    | -20.20   |
| 105.00 | 32.23   | 12.31   | 44.53    | -19.92   |
| 110.00 | 32.09   | 12.46   | 44.55    | -19.63   |
| 115.00 | 31.90   | 12.57   | 44.47    | -19.33   |
| 120.00 | 31.66   | 12.64   | 44.31    | -19.02   |
| 125.00 | 31.38   | 12.68   | 44.06    | -18.71   |
| 130.00 | 31.06   | 12.68   | 43.74    | -18.39   |
| 135.00 | 30.70   | 12.66   | 43.36    | -18.04   |
| 140.00 | 30.30   | 12.62   | 42.92    | -17.68   |
| 145.00 | 29.87   | 12.56   | 42.43    | -17.30   |
| 150.00 | 29.40   | 12.49   | 41.89    | -16.91   |
| 155.00 | 28.90   | 12.40   | 41.30    | -16.50   |
| 160.00 | 28.37   | 12.29   | 40.66    | -16.07   |
| 165.00 | 27.81   | 12.17   | 39.98    | -15.64   |
| 170.00 | 27.22   | 12.03   | 39.25    | -15.19   |
| 175.00 | 26.61   | 11.87   | 38.47    | -14.74   |
| 180.00 | 25.97   | 11.69   | 37.66    | -14.28   |
| 185.00 | 25.31   | 11.49   | 36.80    | -13.81   |
| 190.00 | 24.62   | 11.28   | 35.90    | -13.34   |
| 195.00 | 23.91   | 11.05   | 34.96    | -12.86   |
| 200.00 | 23.18   | 10.80   | 33.98    | -12.38   |
| 205.00 | 22.43   | 10.54   | 32.97    | -11.89   |
| 210.00 | 21.66   | 10.25   | 31.91    | -11.41   |
| 215.00 | 20.87   | 9.95    | 30.82    | -10.91   |
| 220.00 | 20.06   | 9.64    | 29.69    | -10.42   |
| 225.00 | 19.23   | 9.30    | 28.53    | -9.93    |
| 230.00 | 18.38   | 8.95    | 27.33    | -9.43    |
| 235.00 | 17.51   | 8.58    | 26.09    | -8.94    |
| 240.00 | 16.63   | 8.19    | 24.82    | -8.44    |
| 245.00 | 15.73   | 7.78    | 23.51    | -7.95    |

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|        |       |      |       |       |
|--------|-------|------|-------|-------|
| 250.00 | 14.81 | 7.36 | 22.17 | -7.45 |
| 255.00 | 13.87 | 6.92 | 20.79 | -6.95 |
| 260.00 | 12.92 | 6.46 | 19.38 | -6.46 |
| 265.00 | 11.94 | 5.99 | 17.93 | -5.96 |
| 270.00 | 10.95 | 5.49 | 16.44 | -5.46 |
| 275.00 | 9.94  | 4.98 | 14.92 | -4.96 |
| 280.00 | 8.91  | 4.45 | 13.37 | -4.46 |
| 285.00 | 7.87  | 3.91 | 11.77 | -3.96 |
| 290.00 | 6.80  | 3.34 | 10.14 | -3.45 |
| 295.00 | 5.71  | 2.76 | 8.48  | -2.95 |
| 300.00 | 4.60  | 2.17 | 6.77  | -2.44 |
| 305.00 | 3.48  | 1.55 | 5.03  | -1.93 |
| 310.00 | 2.33  | 0.92 | 3.24  | -1.41 |
| 315.00 | 1.15  | 0.27 | 1.42  | -0.89 |

### Rezultatele din fișierul RNACA4

PROGRAM GNACA4G ;FISIER DE REZULTATE RNACA4  
 REZULTATELE FUNCTIEI DE GROSIME, A FUNCTIEI DE SCHELET SI CONTUR NACA4  
 Pozitionarea profilului r[m]= 1.4

l[mm]= 294 drel = .188 ysmax = .04  
 rA[mm]= 11.44999 rF[mm]= 1.091069

\*\*\*\*\*

x[mm] y[mm]+- ys (mm) ycs (mm) yci (mm)  
 \*\*\*\*\*

|        |       |       |       |        |
|--------|-------|-------|-------|--------|
| 0.00   | 0.00  | 0.00  | 0.00  | 0.00   |
| 5.00   | 10.08 | 0.98  | 11.06 | -9.10  |
| 10.00  | 13.84 | 1.91  | 15.75 | -11.92 |
| 15.00  | 16.51 | 2.81  | 19.32 | -13.71 |
| 20.00  | 18.61 | 3.66  | 22.27 | -14.95 |
| 25.00  | 20.31 | 4.47  | 24.78 | -15.84 |
| 30.00  | 21.73 | 5.23  | 26.96 | -16.49 |
| 35.00  | 22.91 | 5.96  | 28.87 | -16.96 |
| 40.00  | 23.92 | 6.64  | 30.56 | -17.28 |
| 45.00  | 24.76 | 7.28  | 32.04 | -17.48 |
| 50.00  | 25.47 | 7.87  | 33.34 | -17.59 |
| 55.00  | 26.05 | 8.43  | 34.48 | -17.63 |
| 60.00  | 26.53 | 8.94  | 35.47 | -17.59 |
| 65.00  | 26.91 | 9.41  | 36.32 | -17.51 |
| 70.00  | 27.21 | 9.83  | 37.04 | -17.37 |
| 75.00  | 27.42 | 10.22 | 37.64 | -17.20 |
| 80.00  | 27.56 | 10.56 | 38.12 | -17.00 |
| 85.00  | 27.63 | 10.86 | 38.49 | -16.78 |
| 90.00  | 27.64 | 11.11 | 38.75 | -16.53 |
| 95.00  | 27.59 | 11.33 | 38.91 | -16.26 |
| 100.00 | 27.48 | 11.50 | 38.98 | -15.99 |
| 105.00 | 27.33 | 11.63 | 38.95 | -15.70 |
| 110.00 | 27.12 | 11.71 | 38.83 | -15.41 |
| 115.00 | 26.87 | 11.75 | 38.63 | -15.12 |
| 120.00 | 26.58 | 11.76 | 38.34 | -14.83 |
| 125.00 | 26.25 | 11.74 | 37.99 | -14.51 |
| 130.00 | 25.89 | 11.70 | 37.59 | -14.18 |
| 135.00 | 25.48 | 11.65 | 37.13 | -13.84 |
| 140.00 | 25.05 | 11.57 | 36.62 | -13.48 |
| 145.00 | 24.58 | 11.48 | 36.06 | -13.10 |
| 150.00 | 24.08 | 11.36 | 35.45 | -12.72 |
| 155.00 | 23.56 | 11.23 | 34.79 | -12.33 |
| 160.00 | 23.00 | 11.08 | 34.09 | -11.92 |
| 165.00 | 22.43 | 10.91 | 33.34 | -11.52 |
| 170.00 | 21.82 | 10.72 | 32.55 | -11.10 |
| 175.00 | 21.20 | 10.51 | 31.71 | -10.68 |
| 180.00 | 20.55 | 10.29 | 30.84 | -10.26 |



|        |       |       |       |       |
|--------|-------|-------|-------|-------|
| 185.00 | 19.88 | 10.04 | 29.92 | -9.84 |
| 190.00 | 19.19 | 9.78  | 28.97 | -9.41 |
| 195.00 | 18.48 | 9.50  | 27.97 | -8.98 |
| 200.00 | 17.75 | 9.19  | 26.94 | -8.55 |
| 205.00 | 17.00 | 8.87  | 25.87 | -8.12 |
| 210.00 | 16.23 | 8.53  | 24.76 | -7.70 |
| 215.00 | 15.44 | 8.17  | 23.62 | -7.27 |
| 220.00 | 14.64 | 7.80  | 22.43 | -6.84 |
| 225.00 | 13.82 | 7.40  | 21.22 | -6.41 |
| 230.00 | 12.97 | 6.99  | 19.96 | -5.99 |
| 235.00 | 12.12 | 6.55  | 18.67 | -5.57 |
| 240.00 | 11.24 | 6.10  | 17.34 | -5.14 |
| 245.00 | 10.35 | 5.63  | 15.97 | -4.72 |
| 250.00 | 9.44  | 5.13  | 14.57 | -4.30 |
| 255.00 | 8.51  | 4.63  | 13.13 | -3.88 |
| 260.00 | 7.56  | 4.10  | 11.65 | -3.46 |
| 265.00 | 6.59  | 3.55  | 10.14 | -3.04 |
| 270.00 | 5.60  | 2.98  | 8.59  | -2.62 |
| 275.00 | 4.60  | 2.40  | 6.99  | -2.20 |
| 280.00 | 3.57  | 1.79  | 5.36  | -1.78 |
| 285.00 | 2.52  | 1.17  | 3.69  | -1.35 |
| 290.00 | 1.45  | 0.53  | 1.98  | -0.93 |

### Rezultatele din fișierul RNACA5

PROGRAM GNACA4G ;FISIER DE REZULTATE RNACA5

REZULTATELE FUNCTIEI DE GROSIME, A FUNCTIEI DE SCHELET SI CONTUR NACA4

Positionarea profilului r[m]= 1.6

l[mm]= 272 drel = .172 ysmax = .04

rA[mm]= 8.866822 rF[mm]= .844919

\*\*\*\*\*

x[mm] y[mm]+- ys(mm) ycs(mm) yci(mm)

\*\*\*\*\*

|        |       |       |       |        |
|--------|-------|-------|-------|--------|
| 0.00   | 0.00  | 0.00  | 0.00  | 0.00   |
| 5.00   | 8.85  | 0.98  | 9.82  | -7.87  |
| 10.00  | 12.13 | 1.91  | 14.03 | -10.22 |
| 15.00  | 14.44 | 2.79  | 17.24 | -11.65 |
| 20.00  | 16.25 | 3.63  | 19.88 | -12.61 |
| 25.00  | 17.70 | 4.43  | 22.13 | -13.28 |
| 30.00  | 18.90 | 5.17  | 24.07 | -13.73 |
| 35.00  | 19.89 | 5.87  | 25.77 | -14.02 |
| 40.00  | 20.72 | 6.53  | 27.25 | -14.19 |
| 45.00  | 21.40 | 7.14  | 28.54 | -14.27 |
| 50.00  | 21.97 | 7.70  | 29.67 | -14.26 |
| 55.00  | 22.42 | 8.22  | 30.64 | -14.20 |
| 60.00  | 22.77 | 8.69  | 31.46 | -14.08 |
| 65.00  | 23.04 | 9.12  | 32.16 | -13.92 |
| 70.00  | 23.23 | 9.50  | 32.73 | -13.73 |
| 75.00  | 23.35 | 9.83  | 33.18 | -13.52 |
| 80.00  | 23.40 | 10.12 | 33.51 | -13.28 |
| 85.00  | 23.38 | 10.36 | 33.74 | -13.03 |
| 90.00  | 23.32 | 10.56 | 33.87 | -12.76 |
| 95.00  | 23.20 | 10.70 | 33.90 | -12.49 |
| 100.00 | 23.03 | 10.81 | 33.84 | -12.22 |
| 105.00 | 22.82 | 10.87 | 33.68 | -11.95 |
| 110.00 | 22.56 | 10.88 | 33.44 | -11.68 |
| 115.00 | 22.26 | 10.86 | 33.13 | -11.40 |
| 120.00 | 21.93 | 10.83 | 32.76 | -11.10 |
| 125.00 | 21.56 | 10.77 | 32.33 | -10.79 |
| 130.00 | 21.16 | 10.70 | 31.86 | -10.46 |
| 135.00 | 20.73 | 10.60 | 31.33 | -10.13 |
| 140.00 | 20.27 | 10.48 | 30.75 | -9.79  |

|        |       |       |       |       |
|--------|-------|-------|-------|-------|
| 145.00 | 19.78 | 10.34 | 30.13 | -9.44 |
| 150.00 | 19.27 | 10.19 | 29.45 | -9.08 |
| 155.00 | 18.73 | 10.01 | 28.73 | -8.72 |
| 160.00 | 18.16 | 9.81  | 27.97 | -8.35 |
| 165.00 | 17.58 | 9.59  | 27.17 | -7.99 |
| 170.00 | 16.97 | 9.35  | 26.32 | -7.62 |
| 175.00 | 16.34 | 9.09  | 25.43 | -7.25 |
| 180.00 | 15.69 | 8.81  | 24.50 | -6.88 |
| 185.00 | 15.03 | 8.51  | 23.53 | -6.52 |
| 190.00 | 14.34 | 8.19  | 22.53 | -6.15 |
| 195.00 | 13.64 | 7.84  | 21.48 | -5.79 |
| 200.00 | 12.91 | 7.48  | 20.39 | -5.43 |
| 205.00 | 12.17 | 7.10  | 19.27 | -5.07 |
| 210.00 | 11.41 | 6.70  | 18.11 | -4.72 |
| 215.00 | 10.64 | 6.27  | 16.91 | -4.36 |
| 220.00 | 9.84  | 5.83  | 15.67 | -4.01 |
| 225.00 | 9.03  | 5.36  | 14.40 | -3.67 |
| 230.00 | 8.20  | 4.88  | 13.08 | -3.32 |
| 235.00 | 7.36  | 4.37  | 11.73 | -2.98 |
| 240.00 | 6.49  | 3.85  | 10.34 | -2.64 |
| 245.00 | 5.61  | 3.30  | 8.91  | -2.31 |
| 250.00 | 4.71  | 2.74  | 7.44  | -1.97 |
| 255.00 | 3.78  | 2.15  | 5.93  | -1.63 |
| 260.00 | 2.84  | 1.54  | 4.38  | -1.30 |
| 265.00 | 1.88  | 0.91  | 2.79  | -0.96 |
| 270.00 | 0.89  | 0.27  | 1.16  | -0.63 |

### Rezultatele din fișierul RNACA6

PROGRAM GNACA4G ;FISIER DE REZULTATE RNACA6

REZULTATELE FUNCTIEI DE GROSIME, A FUNCTIEI DE SCHELET SI CONTUR NACA4

Positionarea profilului r[m]= 1.8

l[mm]= 250 drel = .144 ysmax = .04

rA[mm]= 5.712249 rF[mm]= .5443199

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| x[mm] | y[mm]± | ys (mm) | yCS (mm) | yCi (mm) |
|-------|--------|---------|----------|----------|
|-------|--------|---------|----------|----------|

\*\*\*\*\*

|        |       |       |       |       |
|--------|-------|-------|-------|-------|
| 0.00   | 0.00  | 0.00  | 0.00  | 0.00  |
| 5.00   | 7.08  | 0.97  | 8.05  | -6.10 |
| 10.00  | 9.68  | 1.90  | 11.58 | -7.78 |
| 15.00  | 11.51 | 2.77  | 14.29 | -8.74 |
| 20.00  | 12.92 | 3.60  | 16.52 | -9.32 |
| 25.00  | 14.05 | 4.38  | 18.42 | -9.67 |
| 30.00  | 14.96 | 5.10  | 20.06 | -9.86 |
| 35.00  | 15.71 | 5.78  | 21.49 | -9.94 |
| 40.00  | 16.33 | 6.40  | 22.73 | -9.93 |
| 45.00  | 16.82 | 6.97  | 23.79 | -9.84 |
| 50.00  | 17.21 | 7.50  | 24.71 | -9.71 |
| 55.00  | 17.52 | 7.97  | 25.49 | -9.54 |
| 60.00  | 17.74 | 8.40  | 26.14 | -9.34 |
| 65.00  | 17.89 | 8.77  | 26.67 | -9.12 |
| 70.00  | 17.98 | 9.10  | 27.08 | -8.88 |
| 75.00  | 18.01 | 9.37  | 27.38 | -8.63 |
| 80.00  | 17.98 | 9.60  | 27.58 | -8.38 |
| 85.00  | 17.90 | 9.77  | 27.68 | -8.13 |
| 90.00  | 17.78 | 9.90  | 27.68 | -7.88 |
| 95.00  | 17.61 | 9.97  | 27.59 | -7.64 |
| 100.00 | 17.41 | 10.00 | 27.41 | -7.41 |
| 105.00 | 17.17 | 9.99  | 27.16 | -7.18 |
| 110.00 | 16.89 | 9.96  | 26.85 | -6.94 |
| 115.00 | 16.58 | 9.90  | 26.48 | -6.68 |
| 120.00 | 16.25 | 9.82  | 26.07 | -6.43 |

|        |       |      |       |       |
|--------|-------|------|-------|-------|
| 125.00 | 15.88 | 9.72 | 25.60 | -6.16 |
| 130.00 | 15.49 | 9.60 | 25.09 | -5.89 |
| 135.00 | 15.07 | 9.46 | 24.53 | -5.62 |
| 140.00 | 14.63 | 9.29 | 23.92 | -5.35 |
| 145.00 | 14.17 | 9.10 | 23.27 | -5.07 |
| 150.00 | 13.69 | 8.89 | 22.58 | -4.80 |
| 155.00 | 13.19 | 8.66 | 21.84 | -4.53 |
| 160.00 | 12.67 | 8.40 | 21.07 | -4.27 |
| 165.00 | 12.13 | 8.12 | 20.25 | -4.00 |
| 170.00 | 11.57 | 7.82 | 19.39 | -3.74 |
| 175.00 | 10.99 | 7.50 | 18.49 | -3.49 |
| 180.00 | 10.40 | 7.16 | 17.56 | -3.24 |
| 185.00 | 9.79  | 6.79 | 16.58 | -3.00 |
| 190.00 | 9.17  | 6.40 | 15.57 | -2.77 |
| 195.00 | 8.53  | 5.99 | 14.51 | -2.54 |
| 200.00 | 7.87  | 5.56 | 13.42 | -2.31 |
| 205.00 | 7.20  | 5.10 | 12.30 | -2.10 |
| 210.00 | 6.51  | 4.62 | 11.13 | -1.89 |
| 215.00 | 5.80  | 4.12 | 9.93  | -1.68 |
| 220.00 | 5.08  | 3.60 | 8.68  | -1.48 |
| 225.00 | 4.34  | 3.06 | 7.40  | -1.29 |
| 230.00 | 3.59  | 2.49 | 6.08  | -1.10 |
| 235.00 | 2.81  | 1.90 | 4.71  | -0.91 |
| 240.00 | 2.02  | 1.29 | 3.31  | -0.73 |
| 245.00 | 1.21  | 0.66 | 1.87  | -0.55 |
| 250.00 | 0.38  | 0.00 | 0.38  | -0.38 |

### Rezultatele din fișierul RNACA7

PROGRAM GNACA4G ;FISIER DE REZULTATE RNACA7

REZULTATELE FUNCTIEI DE GROSIME, A FUNCTIEI DE SCHELET SI CONTUR NACA4

Positionarea profilului r[m]= 2

l[mm]= 228 drel = .14 ysmax = .04

rA[mm]= 4.924171 rF[mm]= .469224

\*\*\*\*\*

| x[mm]  | y[mm]± | ys (mm) | ycs (mm) | yci (mm) |
|--------|--------|---------|----------|----------|
| 0.00   | 0.00   | 0.00    | 0.00     | 0.00     |
| 5.00   | 6.55   | 0.97    | 7.52     | -5.58    |
| 10.00  | 8.94   | 1.89    | 10.83    | -7.05    |
| 15.00  | 10.60  | 2.75    | 13.35    | -7.85    |
| 20.00  | 11.87  | 3.56    | 15.43    | -8.31    |
| 25.00  | 12.87  | 4.31    | 17.18    | -8.55    |
| 30.00  | 13.67  | 5.01    | 18.68    | -8.66    |
| 35.00  | 14.31  | 5.66    | 19.97    | -8.65    |
| 40.00  | 14.82  | 6.25    | 21.07    | -8.58    |
| 45.00  | 15.22  | 6.78    | 22.00    | -8.44    |
| 50.00  | 15.52  | 7.26    | 22.78    | -8.26    |
| 55.00  | 15.74  | 7.68    | 23.42    | -8.06    |
| 60.00  | 15.88  | 8.05    | 23.93    | -7.83    |
| 65.00  | 15.95  | 8.37    | 24.32    | -7.58    |
| 70.00  | 15.96  | 8.63    | 24.59    | -7.33    |
| 75.00  | 15.92  | 8.83    | 24.75    | -7.08    |
| 80.00  | 15.82  | 8.98    | 24.80    | -6.84    |
| 85.00  | 15.67  | 9.08    | 24.75    | -6.60    |
| 90.00  | 15.49  | 9.12    | 24.61    | -6.37    |
| 95.00  | 15.26  | 9.11    | 24.37    | -6.15    |
| 100.00 | 15.00  | 9.08    | 24.08    | -5.91    |
| 105.00 | 14.70  | 9.03    | 23.72    | -5.67    |
| 110.00 | 14.37  | 8.95    | 23.32    | -5.42    |
| 115.00 | 14.01  | 8.84    | 22.85    | -5.16    |
| 120.00 | 13.62  | 8.72    | 22.34    | -4.90    |

\*\*\*\*\*

|        |       |      |       |       |
|--------|-------|------|-------|-------|
| 125.00 | 13.21 | 8.56 | 21.77 | -4.64 |
| 130.00 | 12.77 | 8.39 | 21.16 | -4.38 |
| 135.00 | 12.31 | 8.19 | 20.49 | -4.12 |
| 140.00 | 11.83 | 7.96 | 19.79 | -3.87 |
| 145.00 | 11.32 | 7.71 | 19.03 | -3.62 |
| 150.00 | 10.80 | 7.44 | 18.24 | -3.37 |
| 155.00 | 10.26 | 7.14 | 17.40 | -3.12 |
| 160.00 | 9.70  | 6.81 | 16.51 | -2.89 |
| 165.00 | 9.12  | 6.47 | 15.59 | -2.66 |
| 170.00 | 8.53  | 6.09 | 14.62 | -2.43 |
| 175.00 | 7.92  | 5.70 | 13.61 | -2.22 |
| 180.00 | 7.29  | 5.28 | 12.56 | -2.01 |
| 185.00 | 6.64  | 4.83 | 11.47 | -1.81 |
| 190.00 | 5.98  | 4.36 | 10.34 | -1.61 |
| 195.00 | 5.29  | 3.87 | 9.16  | -1.43 |
| 200.00 | 4.60  | 3.35 | 7.95  | -1.25 |
| 205.00 | 3.88  | 2.81 | 6.69  | -1.07 |
| 210.00 | 3.15  | 2.24 | 5.39  | -0.90 |
| 215.00 | 2.39  | 1.65 | 4.04  | -0.74 |
| 220.00 | 1.62  | 1.04 | 2.65  | -0.58 |
| 225.00 | 0.82  | 0.40 | 1.22  | -0.43 |

### Rezultatele din fișierul RNACA8

PROGRAM GNACA4G ;FISIER DE REZULTATE RNACA8

REZULTATELE FUNCTIEI DE GROSIME, A FUNCTIEI DE SCHELET SI CONTUR NACA4

Pozitionarea profilului r[m]= 2.2

l[mm]= 205 drel = .124 ysmax = .04

rA[mm]= 3.473277 rF[mm]= .3309684

\*\*\*\*\*

| x[mm] | y[mm]+- | ys (mm) | ycs (mm) | yci (mm) |
|-------|---------|---------|----------|----------|
|-------|---------|---------|----------|----------|

\*\*\*\*\*

|        |       |      |       |       |
|--------|-------|------|-------|-------|
| 0.00   | 0.00  | 0.00 | 0.00  | 0.00  |
| 5.00   | 5.48  | 0.97 | 6.45  | -4.51 |
| 10.00  | 7.45  | 1.88 | 9.33  | -5.57 |
| 15.00  | 8.81  | 2.73 | 11.54 | -6.08 |
| 20.00  | 9.83  | 3.51 | 13.34 | -6.32 |
| 25.00  | 10.62 | 4.24 | 14.86 | -6.39 |
| 30.00  | 11.24 | 4.90 | 16.14 | -6.34 |
| 35.00  | 11.72 | 5.51 | 17.23 | -6.22 |
| 40.00  | 12.09 | 6.05 | 18.14 | -6.04 |
| 45.00  | 12.36 | 6.53 | 18.89 | -5.83 |
| 50.00  | 12.55 | 6.95 | 19.50 | -5.60 |
| 55.00  | 12.66 | 7.31 | 19.97 | -5.35 |
| 60.00  | 12.71 | 7.61 | 20.32 | -5.10 |
| 65.00  | 12.70 | 7.85 | 20.55 | -4.85 |
| 70.00  | 12.64 | 8.02 | 20.66 | -4.61 |
| 75.00  | 12.52 | 8.14 | 20.66 | -4.38 |
| 80.00  | 12.37 | 8.20 | 20.56 | -4.17 |
| 85.00  | 12.17 | 8.20 | 20.37 | -3.98 |
| 90.00  | 11.94 | 8.17 | 20.10 | -3.77 |
| 95.00  | 11.67 | 8.11 | 19.78 | -3.56 |
| 100.00 | 11.37 | 8.02 | 19.40 | -3.35 |
| 105.00 | 11.05 | 7.91 | 18.96 | -3.13 |
| 110.00 | 10.70 | 7.78 | 18.47 | -2.92 |
| 115.00 | 10.32 | 7.61 | 17.93 | -2.71 |
| 120.00 | 9.92  | 7.42 | 17.33 | -2.50 |
| 125.00 | 9.50  | 7.20 | 16.69 | -2.30 |
| 130.00 | 9.05  | 6.95 | 16.00 | -2.10 |
| 135.00 | 8.59  | 6.68 | 15.27 | -1.91 |
| 140.00 | 8.11  | 6.38 | 14.49 | -1.73 |
| 145.00 | 7.61  | 6.05 | 13.66 | -1.56 |

|        |      |      |       |       |
|--------|------|------|-------|-------|
| 150.00 | 7.09 | 5.69 | 12.79 | -1.40 |
| 155.00 | 6.56 | 5.31 | 11.87 | -1.25 |
| 160.00 | 6.01 | 4.90 | 10.91 | -1.11 |
| 165.00 | 5.44 | 4.47 | 9.91  | -0.98 |
| 170.00 | 4.86 | 4.00 | 8.86  | -0.86 |
| 175.00 | 4.26 | 3.51 | 7.77  | -0.74 |
| 180.00 | 3.64 | 2.99 | 6.63  | -0.64 |
| 185.00 | 3.00 | 2.45 | 5.45  | -0.55 |
| 190.00 | 2.35 | 1.88 | 4.23  | -0.47 |
| 195.00 | 1.67 | 1.28 | 2.95  | -0.40 |
| 200.00 | 0.98 | 0.65 | 1.63  | -0.33 |
| 205.00 | 0.27 | 0.00 | 0.27  | -0.27 |

## 3.6. Programul RVER

### 3.6.1. Programul RVER.BAS

```
REM program de asamblare a modelului nou pentru o turbina in studiu
REM rezultatele se retin in RVERj.word
REM completarea cu o noua secventa geometrie >performante
REM varianta A,B,C,D
CLS
PRINT "program RVER.BAS;rezultate Rverj.DOC"
PRINT "CODUL TURBINEI:  MARGA"
INPUT "codul turbinei"; codt$
PRINT "CODUL TURBINEI:"; codt$
INPUT "enter filename"; n$
OPEN n$ FOR OUTPUT AS #1
PRINT #1, "program RVER.BAS      "
REM GOTO 890
PRINT #1, "FISIER REZULTATE:"; n$
PRINT #1, "CODUL TURBINEI"; codt$
PRINT "Date pentru amsamblul turbinei D[m], uR[m/s], v1[m/s], RO[kg/m3] "
REM INPUT "D[m]= ?"; D
REM INPUT " uR[m/s]=?"; ur
REM INPUT " v1[m/s]=?"; v1
REM INPUT "kv3a=?"; kv3a
READ D, uR, v1, Ro, kv3a, GrD
DATA 4.5,28.8,9.6,1.225,.7,.75
LET v3a = kv3a * v1
REM INPUT " RO[kg/m3]=?"; RO
LET kvTa = (1 + kv3a) / 2
LET vTa = kvTa * v1
LET PC = Ro * v1 * v1 * v1 / 2 * 3.1415 * D * D / 4
LET dint = .2 * D
LET LambD = uR / v1
INPUT "Nr.secțiuni de calcul"; imax
LET Delr = (D / 2 - dint / 2) / imax
REM INPUT "Gradul de reacție la raza D/2 GrD=?"; GrD
DIM r(imax)
DIM kt(imax)
DIM Lambr(imax)
DIM GR(imax)
DIM Delpc(imax)
DIM kdps(imax)
DIM v3a(imax)
DIM Delps(imax)
DIM Dpech(imax)
```

```

DIM vt(imax)
DIM DelP(imax)
DIM CM(imax)
DIM CF(imax)
DIM CF1(imax)
DIM CP(imax)
DIM Delf(imax)
DIM Delf1(imax)
5 LET SUMDelp = 0
6 LET SUMDelf = 0
PRINT "Optiuni pentru gradele de reactie cu raza"
PRINT "q=1 repartitie constanta, q=2 r.liniara, q=3 r. patratica ,q=4
r.hiperbolica,q=5 pentru END"
INPUT "q=?"; Q
FOR i = 1 TO imax
LET r(1) = D / 2 - Delr / 2
IF i > 1 THEN r(i) = r(i - 1) - Delr
LET Lambr(i) = LambD * 2 * r(i) / D
LET Delpc(i) = Ro * v1 * v1 * v1 * 3.1415 * r(i) * Delr
IF Q = 1 THEN GOTO 10
IF Q = 2 THEN GOTO 20
IF Q = 3 THEN GOTO 30
IF Q = 4 THEN GOTO 40
IF Q = 5 THEN END
10 LET GR(i) = GrD
11 GOTO 100
20 LET GR(i) = GrD - .01 * (i - 1)
21 GOTO 100
30 LET GR(i) = GrD - .002 * (i - 1) * (i - 1)
31 GOTO 100
40 LET GR(i) = GrD / (1 + .01 * (i - 1))
41 GOTO 100
100 LET kt(i) = (GR(i) - 1) + SQR((1 - GR(i)) * (1 - GR(i)) + (1 - kv3a * kv3a)
/ (Lambr(i) * Lambr(i)))
105 LET vt(i) = kt(i) * uR / D * 2 * r(i)
110 LET kdps(i) = 2 * GR(i) * kt(i) * Lambr(i) * Lambr(i)
115 LET Delps(i) = kdps(i) * v1 * v1 / 2 * Ro
120 LET CM(i) = 2 * kvTa * kt(i) * Lambr(i)
130 LET CP(i) = CM(i) * Lambr(i)
140 LET CF(i) = CP(i) / kvTa
145 LET Delpc(i) = (Ro / 2) * v1 * v1 * v1 * 2 * 3.1415 * r(i) * Delr
150 LET DelP(i) = CP(i) * Delpc(i)
155 LET Delf(i) = CF(i) * (Ro / 2) * v1 * v1 * 2 * 3.1415 * r(i) * Delr
160 LET SUMDelp = SUMDelp + DelP(i)
170 LET SUMDelf = SUMDelf + Delf(i)
200 NEXT i
210 LET CPT = SUMDelp / PC
250 PRINT #1, "REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE "
260 PRINT #1, "D[m]="; D; ";uR[m/s]="; uR; ";v1[m/s]="; v1; ";RO[kg/m3]="; Ro;
";kv3a="; kv3a; ";PC[kW]="; PC / 1000; " GR="; GrD
270 PRINT #1,
"
"
280 PRINT " i      r[m]      Gr      kt      kdps      CF      CP
Lambr "
282 PRINT
"
"
290 FOR i = 1 TO imax
300 PRINT USING "###  ##.##  .####  #.####  #.####  #.####  #.####
##.## "; i; r(i); GR(i); kt(i); kdps(i); CF(i); CP(i); Lambr(i)
310 NEXT i
320 PRINT "pentru continuare introduceti x=1 ;pentru oprire x=2"

```

```

PRINT "pentru alta varianta pentru Gr x=3"
330 INPUT "x=? "; x
340 IF x = 2 THEN END
    IF x = 3 THEN GOTO 5
341 CLS
400 PRINT "REZULTATELE CALCULELOR (MARIMI FIZICE) PENTRU URMATOARELE DATE"
410 PRINT "D[m]="; D; "uR[m/s]="; uR; "v1[m/s]="; v1; "v3a[m/s]="; v3a;
"Delr="; Delr
420 PRINT
"
430 PRINT " i      r[m]      Lambr      vt[m/s]      Delps[Pa]      DelPC[kW]      DelP[kW]
Delf[kN] "
440 PRINT
"
441 FOR i = 1 TO imax
450 PRINT USING "###  ##.##  ##.##  ###.##  ###.###  ###.###  ###.###
##.###"; i; r(i); Lambr(i); vt(i); Delps(i); Delpc(i) / 1000; DelP(i) / 1000;
Delf(i) / 1000
451 NEXT i
460 PRINT "Valori insumate:"; "PC[kW]="; PC / 1000; " SUMDelP[kW]="; SUMDelP /
1000; " CPT="; CPT
471 PRINT "PRECIZARI: PC este puterea cinetica asociata TURBINEI ;SUMDelP este
puterea teoretica extrasa ; CPT este coeficientul teoretic global al TURBINEI "
475 INPUT " CONT o tasta numerica"; Q
CLS
480 PRINT "Petru continuare se ofera variante y=1 reluare a coeficientilor"
481 PRINT " y=2 variante pentru Gr"
482 PRINT " y=4 END"
    PRINT " y=3 continuare"
483 IF y = 1 THEN GOTO 210
484 IF y = 2 THEN GOTO 5
485 IF y = 4 THEN END
490 CLS
500 LET Dpech(1) = 0
510 FOR i = 2 TO imax
520 LET Dpech(i) = -Ro * ((vt(i - 1) * vt(i - 1) / r(i - 1) - vt(i) * vt(i) /
r(i))) * (r(i - 1) - r(i)) + Dpech(i - 1)
525 NEXT i
530 PRINT "COMPARATIE INTRE PRESIUNI DIN CALCUL SI CELE DE ECHILIBRU RADIAL"
540 PRINT " i      r(i)[m]      Delps(i)[Pa]      Dpech(i)[Pa]
"
550 FOR i = 1 TO imax
560 PRINT USING " ###  ###.###  ###.###  ###.###"; i;
r(i); Delps(i); Dpech(i)
570 NEXT i
600 PRINT "OPTIUNI O=1 GOTO 5 pentru variante sau O=2 continuare sau O=3 pentru
END"
610 INPUT "O="; o
620 IF o = 1 THEN GOTO 5
621 IF o = 3 THEN END
700 REM Comparatii pentru forte axiale
701 LET SumF = 0
    LET SUMF1 = 0
710 FOR i = 1 TO imax
720 CF1(i) = 1 - (kv3a * kv3a) + kdps(i)
721 DelF1(i) = CF1(i) * Ro * (v1 * v1 / 2) * 2 * 3.1415 * r(i) * Delr
722 LET SUMF1 = SUMF1 + DelF1(i)
730 NEXT i
731 CLS
740 PRINT "COMPARATII PENTRU FORTELE AXIALE (COEFICIENTI Si FORTE)"
750 PRINT "

```

```
760 PRINT " i          r(i)          CF          CF1          DelF[kN]          DelF1[kN]
"
770 PRINT " _____"
780 FOR i = 1 TO imax
790 PRINT USING "###          ##.###          #.###          #.###          ###.###          ##.###";
i; r(i); CF(i); CF1(i); DelF(i) / 1000; DelF1(i) / 1000
791 NEXT i
800 PRINT "SUMF[kN]="; SUMDelF / 1000, "SUMF1[kN]="; SUMF1 / 1000
810 PRINT "OPTIUNI 1 : END; 2 : variante noi; 3 : continuare"
815 INPUT "q="; Q
820 IF Q = 2 GOTO 5
      IF Q = 3 GOTO 850
      IF Q = 1 GOTO 900
850 REM CALCULE CINEMATICE PENTRU PROIECTAREA UNEI TURBINE
REM INPUT "codul turbinei"; cod$
REM INPUT "enter filename"; n$
REM OPEN n$ FOR OUTPUT AS #1
DIM DelS(imax)
DIM u(imax)
DIM DelQ(imax)
DIM v3(imax)
DIM w1(imax)
DIM w3(imax)
DIM winf(imax)
DIM delpd(imax)
DIM delptot(imax)
DIM bet1gr(imax)
DIM bet3gr(imax)
DIM betinf(imax)
DIM alf3gr(imax)
DIM cylt(imax)
REM numar de palete z= 2,3,4,5
DIM t2(imax)
DIM t3(imax)
DIM t4(imax)
DIM t5(imax)
DIM l2(imax)
DIM l3(imax)
DIM l4(imax)
DIM l5(imax)
REM INPUT "portanta maxima utilizata in calcul"; Cymax
LET cymax = 1.2
omeg = uR * 2 / D
PI = 3.141592654#
FOR i = 1 TO imax
u(i) = omeg * r(i)
DelS(i) = 2 * PI * r(i) * Delr
DelQ(i) = DelS(i) * vTa
v3(i) = SQR(u(i) ^ 2 + vt(i) ^ 2)
w1(i) = SQR(u(i) ^ 2 + v1 ^ 2)
w3(i) = SQR(v3a(i) ^ 2 + (u(i) + vt(i)) ^ 2)
winf(i) = SQR((vTa ^ 2) + (u(i) + vt(i) / 2) ^ 2)
bet1gr(i) = 180 / PI * ATN(v1 / u(i))
bet3gr(i) = 180 / PI * ATN(v3a / (u(i) + vt(i)))
betinf(i) = 180 / PI * ATN(vTa / (u(i) + vt(i) / 2))
alf3gr(i) = 180 / PI * ATN(-v3a / (vt(i))) + 180
cylt(i) = 2 * vt(i) / winf(i)
t2(i) = 2 * PI * r(i) / 2: t3 = 2 * PI * r(i) / 3: t4(i) = 2 * OI * r(i) / 4:
t5(i) = 2 * PI * r(i) / 5
l2(i) = cylt(i) * t2(i) / cymax
l3(i) = cylt(i) * t3(i) / cymax
```



```
l4(i) = cylt(i) * t4(i) / cymax
l5(i) = cylt(i) * t5(i) / cymax
NEXT i
SumQ = 0
FOR i = 1 TO imax
SumQ = SumQ + DelQ(i)
NEXT i
Qtot = SumQ
PRINT Qtot
SumP = 0
FOR i = 1 TO imax
SumP = SumP + DelP(i)
NEXT i
Ptot = SumP
PRINT Ptot
SumF = 0
FOR i = 1 TO imax
SumF = SumF + Delf(i)
NEXT i
Ftot = SumF
PRINT Ftot
CLS
PRINT "REZULTATELE CALCULELOR CINEMATICE PENTRU TURBINA CU CODUL AFISAT"
PRINT "*****"
PRINT "programe,coduri,constante,dimensiuni:"
PRINT "PROGRAM MODNTURB.BAS"; "REZULTATE IN WORD:"; n$
PRINT "CONSTANTE:"
PRINT "D[m]: "; D; ", db[m]: "; .2 * D; ", Del r [m]: "; .4 * D / imax; ",
RO[kg/m3] :"; Ro
PRINT "uR[m/s]= "; uR; " ,V1[m/s] : "; v1; ", V3a[m/s] "; v3a; ", VTa(m / s) =
"; vTa; ""
PRINT "GrD= "; GrD; ", LambD= "; LambD; ", kv3a= "; kv3a; ", kvTa= "; kvTa
PRINT "*****"
PRINT "Qtot[m3/s]= "; Qtot; " ,Pt[kW]= "; Ptot; " ,Faxtot[N]= "; Ftot
PRINT "_____ "
PRINT "*****"
PRINT "r[m] ";
FOR i = 1 TO imax
PRINT USING "##.## " ; r(i);
NEXT i
PRINT "ur[m/s] ";
FOR i = 1 TO imax
PRINT USING "##.## " ; u(i);
NEXT i
PRINT "vt[m/s] ";
FOR i = 1 TO imax
PRINT USING "##.## " ; vt(i);
NEXT i
PRINT "v3[m/s] ";
FOR i = 1 TO imax
PRINT USING "##.## " ; v3(i);
NEXT i
PRINT "w1[m/s] ";
FOR i = 1 TO imax
PRINT USING "##.## " ; w1(i);
NEXT i
PRINT "w3[m/s] ";
FOR i = 1 TO imax
PRINT USING "##.## " ; w3(i);
NEXT i
PRINT "winf[m/s]";
```

```
FOR i = 1 TO imax
PRINT USING "##.## "; winf(i);
NEXT i
PRINT "bet1[gr] ";
FOR i = 1 TO imax
PRINT USING "##.## "; bet1gr(i);
NEXT i
PRINT "bet3[gr] ";
FOR i = 1 TO imax
PRINT USING "##.## "; bet3gr(i);
NEXT i
PRINT "betinf[gr]";
FOR i = 1 TO imax
PRINT USING "##.## "; betinf(i);
NEXT i
PRINT "alf3[gr] ";
FOR i = 1 TO imax
PRINT USING "####.# "; alf3gr(i);
NEXT i
PRINT "cyl/t[-] ";
FOR i = 1 TO imax
PRINT USING "##.## "; cylt(i);
NEXT i
REM urmeaza analiza pasului,a corzii si a soliditatii la diferite numere de
palete
REM z:2,3,4,5 ;t:t2,t3,t4,t5 ;l:l2,l3,l4,l5 lm:lm2,lm3,lm4,lm5
REM S:S2,S3,S4,S5
FOR i = 1 TO imax
t2(i) = 2 * PI * r(i) / 2
t3(i) = 2 * PI * r(i) / 3
t4(i) = 2 * PI * r(i) / 4
t5(i) = 2 * PI * r(i) / 5
l2(i) = cylt(i) * t2(i) / cymax
l3(i) = cylt(i) * t3(i) / cymax
l4(i) = cylt(i) * t4(i) / cymax
l5(i) = cylt(i) * t5(i) / cymax
NEXT i
suml2 = 0: suml3 = 0: suml4 = 0: suml5 = 0
FOR i = 1 TO imax
suml2 = suml2 + l2(i): suml3 = suml3 + l3(i): suml4 = suml4 + l4(i): suml5 =
suml5 + l5(i)
NEXT i
lm2 = suml2 / imax
lm3 = suml3 / imax
lm4 = suml4 / imax
lm5 = suml5 / imax
Sol2 = 2 * lm2 / 1.885 / D
Sol3 = 3 * lm3 / 1.885 / D
Sol4 = 4 * lm4 / 1.885 / D
Sol5 = 5 * lm5 / 1.885 / D
PRINT "*****"
PRINT "REZULTATE CORZI SI SOLIDITATI LA NR.DE PALETE 2,3,4,5"
PRINT
PRINT "*****"
PRINT "z t[m] l[m] r(i) [m]"
PRINT " ";
FOR i = 1 TO imax
PRINT USING "##.## "; r(i);
NEXT i
PRINT
"
```

```
PRINT "2      t2      ";
FOR i = 1 TO imax
PRINT USING "##.## "; t2(i);
NEXT i
PRINT "          12 ";
FOR i = 1 TO imax
PRINT USING "##.## "; 12(i);
NEXT i
PRINT '
PRINT "3      t3      ";
FOR i = 1 TO imax
PRINT USING "##.## "; t3(i);
NEXT i
PRINT "          13 ";
FOR i = 1 TO imax
PRINT USING "##.## "; 13(i);
NEXT i
PRINT '
PRINT "4      t4      ";
FOR i = 1 TO imax
PRINT USING "##.## "; t4(i);
NEXT i
PRINT "          14 ";
FOR i = 1 TO imax
PRINT USING "##.## "; 14(i);
NEXT i
PRINT '
PRINT "5      t5      ";
FOR i = 1 TO imax
PRINT USING "##.## "; t5(i);
NEXT i
PRINT "          15 ";
FOR i = 1 TO imax
PRINT USING "##.## "; 15(i);
NEXT i
PRINT "*****"
PRINT "lm2 [m]= "; lm2; " lm3 [m]= "; lm3; " lm4 [m]= "; lm4; " lm5 [m]= "; lm5
PRINT "_____ "
PRINT "Sol2= "; Sol2; " Sol3= "; Sol3; " Sol4= "; Sol4; " Sol5= "; Sol5
PRINT "*****"
CLS
870 PRINT "SECVENTA NOUA -ALEGEREA GEOMETRIEI PALETEI; - CONTROLUL;
PERFORMANTELOR; "
REM CONSTANTE SUPLIMENTARE:CORZI ,GROSIMI , PROFILE , NR. PALETE, UNGHIURI DE
INSTALARE
DIM lc(imax)
DIM dr(imax)
DIM betinstgr(imax)
DIM tc(imax)
DIM inc(imax)
DIM cyinf(imax)
DIM cxinf(imax)
DIM c11(imax)
DIM winfc(imax)
DIM vtc(imax)
DIM cyltc(imax)
DIM vcyltc(imax)
DIM Delpsc(imax)
DIM Delpdc(imax)
DIM Dpc(imax)
DIM DelPtc(i, ax)
```

```

DIM Grc(imax)
DIM cyANV(imax)
DIM cxANV(imax)
DIM kANV(imax)
DIM Delinc(imax)
DIM RANDA(imax)
REM lc(i)=a+b*r; dr=a1-b1*r;betinstgr(i)=a2/r-b2;profil NACAxxxx;z
REM INPUT "a="; a
REM INPUT "b="; b
REM INPUT "a1="; a1
REM INPUT "a2="; a2
REM INPUT "b1="; b1
REM INPUT "b2="; b2
REM INPUT "i00gr="; i00
READ a, b, a1, b1, a2, b2, I00
DATA .55, .1111, .3, .08,25,6,-4
890 INPUT "z="; z
PRINT #1, "Datele geometrice ale variantei de turbina tehnologizata"
PRINT #1, "lc=a-b*r;      dr=a1-b1*r;      betinstgr=a2/r-b2"
PRINT #1, "  a      b      a1      b1      a2      b2      "
PRINT #1, USING " ##.###  "; a; b; a1; b1; a2; b2
sumlc = 0
FOR i = imax TO 1 STEP -1
lc(i) = a - b * r(i): dr(i) = a1 - b1 * r(i): betinstgr(i) = a2 / r(i) - b2
sumlc = sumlc + lc(i)
NEXT i
PRINT #1, "      MARIMI GEOMETRICE PENTRU PALETE"
PRINT #1, "*****"
PRINT #1, "r[m]      lc[m]      dr=d/lc[-]      betinstgr  "
PRINT #1, "*****"
FOR i = imax TO 1 STEP -1
PRINT #1, USING "##.###      "; r(i); lc(i); dr(i); betinstgr(i)
NEXT i
PRINT #1, "*****"
Lanv = r(1) - r(imax)
Sol = z * sumlc / imax / PI / (r(i) + r(imax))
ANV = Lanv * imax / sumlc
PRINT #1, "ANV="; ANV, "z="; z, " Soliditate:"; Sol
PRINT #1, "*****"
ia = I00 + 13
RE = 6000000!
numre = LOG(RE) / LOG(10)
PRINT #1, "  r      u      inc      cyinf      cxinf      winf      winfc      vt      vtc      Grc      betinf
Delpsc      Delpdc"
PRINT #1, "*****"
SumPtc = 0
FOR i = imax TO 1 STEP -1
inc(i) = betinf(i) - betinstgr(i)
cyinf(i) = 18 / PI * SIN(PI / 180 * (inc(i) - I00))
cxinf(i) = .91 / numre ^ 2.58 + .000005 * dr(i) ^ 2 + (.004 / numre ^ 2 -
.0000025 * dr(i)) * inc(i) ^ 2
tc(i) = 2 * PI * r(i) / z
c11(i) = cyinf(i) * lc(i) / tc(i) / 4
cyltc(i) = 4 * c11(i)
winfc(i) = (-2 * c11(i) * u(i) - SQR(4 * c11(i) ^ 2 * u(i) ^ 2 - 4 * (c11(i) ^
2 - 1) * (u(i) ^ 2 + vTa ^ 2))) / 2 / (c11(i) ^ 2 - 1)
vtc(i) = 2 * c11(i) * winfc(i)
vcyltc(i) = 2 * vtc(i) / winfc(i)

```

```
PRINT #1, USING "##.## "; r(i); u(i); inc(i); cyinf(i); cxinf(i); winf(i);
winfc(i); vt(i); vtc(i);
Delpsc(i) = Ro / 2 * ((u(i) + vtc(i)) ^ 2 + v3a ^ 2 - (u(i) ^ 2 + v1 ^ 2))
Delpdc(i) = Ro / 2 * (v1 ^ 2 - (v3a ^ 2 + vtc(i) ^ 2))
Dpc(i) = Delpsc(i) + Delpdc(i)
DPtc(i) = Dpc(i) * DelQ(i)
Grc(i) = Delpsc(i) / Dpc(i)
PRINT #1, USING "##.## "; Grc(i); betinf(i); Delpsc(i); Delpdc(i)
SumPtc = SumPtc + DPtc(i)
NEXT i
Ptc = SumPtc
REM Puterea teoretica pentru constructie (Ptc) reprezinta puterea absorbita
fara influenta anvergurii si fara disipatiile date de fortele de rezistenta
REM INPUT "; cont
REM Secventa noua RANDAMENTE AERODINAMICE, PUTERI LA ARBORE
REM randa=cyanv/cyinf-cxanv/cyinf*cos(betinf)/sin(betinf)
FOR i = 1 TO imax
Delinc(i) = cyinf(i) / PI / ANV * 57.3 * 1.178
kANV(i) = 18 / PI * (1 - Delinc(i) / (inc(i) - I00 + Delinc(i)))
cyANV(i) = kANV(i) / 18 * PI * cyinf(i)
cxANV(i) = cxinf(i) + (cyinf(i) ^ 2 / PI / ANV * 1.05)
RANDA(i) = cyANV(i) / cyinf(i) - cxANV / cyinf(i) / TAN(betinf(i))
DParb(i) = DPtc(i) * RANDA(i)
SumDParb = SumDParb + DParb(i)
NEXT i
Parb = SumDParb
RANDA = Parb / Ptc
CLS
REM afisaj pentru ultima secventa
PRINT #1, "*****"
PRINT #1, "REZULTATE RANDAMENTE,PUTERI LA ARBORE"
PRINT #1, "*****"
PRINT #1, "r[m]      cyinf  cyANV   cxinf   cxANV   RANDA   Dpc   DelQ   DelPt
DelParb"
PRINT #1,
"*****"
FOR i = 1 TO imax
PRINT #1, USING "##.## "; r(i); cyinf(i); cyANV(i); cxinf(i); cxANV(i);
RANDA(i); Dpc(i); DelQ(i); DPtc(i) / 1000; DParb(i) / 1000
NEXT i
PRINT #1, "DATE INSUMATE"
PRINT #1, "Pt[kW]="; Ptc / 1000; "   Parb[kW]="; Parb / 1000; "   RANDA = ";
RANDA
REM INPUT "cont= 1(cont) sau 2(end)"; cont
CLOSE
900 END
```

### 3.6.2. Cazurile analizate

| Numele fișierului | z | a     | b     | a <sub>1</sub> | b <sub>1</sub> | a <sub>2</sub> | b <sub>2</sub> |
|-------------------|---|-------|-------|----------------|----------------|----------------|----------------|
| RVER1             | 3 | 0,450 | 0,111 | 0,3            | 0,08           | 25             | 6              |
| RVER2             | 4 |       |       |                |                |                |                |
| RVER3             | 5 |       |       |                |                |                |                |
| RVER4             | 6 |       |       |                |                |                |                |
| RVER5             | 3 | 0,550 | 0,111 | 0,3            | 0,08           | 15             | 2              |
| RVER6             | 4 |       |       |                |                |                |                |
| RVER7             | 5 |       |       |                |                |                |                |
| RVER8             | 6 |       |       |                |                |                |                |
| RVER9             | 3 | 0,450 | 0,111 | 0,3            | 0,08           | 15             | 2              |
| RVER10            | 4 |       |       |                |                |                |                |
| RVER11            | 5 |       |       |                |                |                |                |
| RVER12            | 6 |       |       |                |                |                |                |
| RVER13            | 3 | 0,550 | 0,111 | 0,3            | 0,08           | 25             | 6              |
| RVER14            | 4 |       |       |                |                |                |                |
| RVER15            | 5 |       |       |                |                |                |                |
| RVER16            | 6 |       |       |                |                |                |                |

### 3.6.3. Rezultate ale programului RVER.BAS

#### Rezultatele din fișierul RVER1 Varianta A

program RVER.BAS

FISIER REZULTATE:rver1

CODUL TURBINEI Marga

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307 GR= .75

---

Datele geometrice ale variantei de turbina tehnologizata

lc=a-b\*r; dr=a1-b1\*r; betinstgr=a2/r-b2

| a     | b     | a1    | b1    | a2     | b2    |
|-------|-------|-------|-------|--------|-------|
| 0.450 | 0.111 | 0.300 | 0.080 | 25.000 | 6.000 |

MARIMI GEOMETRICE PENTRU PALETE

\*\*\*\*\*

| r[m] | lc[m] | dr=d/lc[-] | betinstgr |
|------|-------|------------|-----------|
|------|-------|------------|-----------|

\*\*\*\*\*

|       |       |       |        |
|-------|-------|-------|--------|
| 0.540 | 0.390 | 0.257 | 40.296 |
| 0.720 | 0.370 | 0.242 | 28.722 |
| 0.900 | 0.350 | 0.228 | 21.778 |
| 1.080 | 0.330 | 0.214 | 17.148 |
| 1.260 | 0.310 | 0.199 | 13.841 |
| 1.440 | 0.290 | 0.185 | 11.361 |
| 1.620 | 0.270 | 0.170 | 9.432  |
| 1.800 | 0.250 | 0.156 | 7.889  |
| 1.980 | 0.230 | 0.142 | 6.626  |
| 2.160 | 0.210 | 0.127 | 5.574  |

\*\*\*\*\*

ANV= 5.39973 z= 3 Soliditate: .5305426

\*\*\*\*\*

```

r   u   inc  cyinf  cxinf  winf  winfc  vt   vtc  Grc  betinf  Delpsc  Delpdc
*****
0.54 6.91 0.12 0.41 0.01 12.59 10.95 5.34 0.78 -3.32 40.41 -21.84 28.42
0.72 9.22 6.22 1.02 0.01 14.25 12.92 4.93 1.61 -0.50 34.94 -9.01 27.20
0.90 11.52 8.82 1.27 0.01 16.03 14.84 4.56 1.75 -0.09 30.60 -2.19 26.91
1.08 13.82 9.97 1.38 0.02 17.90 16.79 4.22 1.69 0.06 27.12 1.65 27.03
1.26 16.13 10.44 1.43 0.02 19.84 18.78 3.92 1.58 0.12 24.28 3.87 27.27
1.44 18.43 10.58 1.44 0.02 21.84 20.82 3.65 1.44 0.16 21.94 5.08 27.51
1.62 20.74 10.55 1.44 0.02 23.88 22.90 3.41 1.31 0.17 19.98 5.57 27.74
1.80 23.04 10.44 1.43 0.02 25.95 25.00 3.19 1.18 0.16 18.33 5.49 27.93
1.98 25.34 10.28 1.41 0.02 28.06 27.13 3.00 1.06 0.15 16.91 4.93 28.10
2.16 27.65 10.11 1.40 0.02 30.18 29.28 2.82 0.95 0.12 15.68 3.92 28.24
*****

```

REZULTATE RANDAMENTE, PUTERI LA ARBORE

```

*****
r[m]      cyinf  cyANV   cxinf   cxANV   RANDA   Dpc    DelQ    DelPt   DelParb
*****
2.16     1.40     1.00    0.02    0.14    0.72   32.16   19.93    0.64    0.46
1.98     1.41     1.01    0.02    0.14    0.72   33.02   18.27    0.60    0.43
1.80     1.43     1.02    0.02    0.14    0.72   33.42   16.61    0.56    0.40
1.62     1.44     1.03    0.02    0.14    0.72   33.31   14.95    0.50    0.36
1.44     1.44     1.03    0.02    0.14    0.72   32.60   13.29    0.43    0.31
1.26     1.43     1.03    0.02    0.14    0.72   31.14   11.63    0.36    0.26
1.08     1.38     0.99    0.02    0.13    0.72   28.68    9.97    0.29    0.21
0.90     1.27     0.91    0.01    0.11    0.72   24.72    8.31    0.21    0.15
0.72     1.02     0.73    0.01    0.07    0.72   18.19    6.64    0.12    0.09
0.54     0.41     0.29    0.01    0.02    0.72    6.58    4.98    0.03    0.02

```

DATE INSUMATE

Pt[kW]= 3.737789      Parb[kW]= 2.681523      RANDA = .717409

**Rezultatele din fișierul RVER2 Varianta A**

program RVER.BAS

FISIER REZULTATE:rver2

CODUL TURBINEI Marga

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307      GR= .75

Datele geometrice ale variantei de turbina tehnologizata

lc=a-b\*r;      dr=a1-b1\*r;      betinstgr=a2/r-b2  
a              b              a1              b1              a2              b2  
0.450          0.111          0.300          0.080          25.000          6.000

MARIMI GEOMETRICE PENTRU PALETE

```

*****
r[m]      lc[m]      dr=d/lc[-]      betinstgr
*****
0.540     0.390     0.257     40.296
0.720     0.370     0.242     28.722
0.900     0.350     0.228     21.778
1.080     0.330     0.214     17.148
1.260     0.310     0.199     13.841
1.440     0.290     0.185     11.361
1.620     0.270     0.170     9.432
1.800     0.250     0.156     7.889
1.980     0.230     0.142     6.626
2.160     0.210     0.127     5.574

```

ANV= 5.39973      z= 4      Soliditate: .70739

\*\*\*\*\*

```

r   u   inc  cyinf  cxinf  winf  winfc  vt  vtc  Grc  betinf  Delpsc  Delpdc
*****
0.54  6.91  0.12  0.41  0.01 12.59 11.04  5.34  1.04 -2.18 40.41 -19.28 28.12
0.72  9.22  6.22  1.02  0.01 14.25 13.15  4.93  2.19 -0.05 34.94 -1.19 25.86
0.90 11.52  8.82  1.27  0.01 16.03 15.10  4.56  2.38  0.25 30.60  8.22 25.33
1.08 13.82  9.97  1.38  0.02 17.90 17.05  4.22  2.29  0.34 27.12 13.27 25.57
1.26 16.13 10.44  1.43  0.02 19.84 19.03  3.92  2.13  0.38 24.28 16.06 26.01
1.44 18.43 10.58  1.44  0.02 21.84 21.05  3.65  1.95  0.40 21.94 17.48 26.47
1.62 20.74 10.55  1.44  0.02 23.88 23.11  3.41  1.76  0.40 19.98 17.94 26.88
1.80 23.04 10.44  1.43  0.02 25.95 25.19  3.19  1.59  0.39 18.33 17.67 27.24
1.98 25.34 10.28  1.41  0.02 28.06 27.31  3.00  1.43  0.38 16.91 16.77 27.54
2.16 27.65 10.11  1.40  0.02 30.18 29.44  2.82  1.27  0.36 15.68 15.31 27.80
*****

```

REZULTATE RANDAMENTE, PUTERI LA ARBORE

```

*****
r[m]      cyinf  cyANV   cxinf   cxANV   RANDA   Dpc   DelQ   DelPt   DelParb
*****
2.16     1.40    1.00    0.02    0.14    0.72   43.10  19.93   0.86    0.62
1.98     1.41    1.01    0.02    0.14    0.72   44.31  18.27   0.81    0.58
1.80     1.43    1.02    0.02    0.14    0.72   44.91  16.61   0.75    0.54
1.62     1.44    1.03    0.02    0.14    0.72   44.82  14.95   0.67    0.48
1.44     1.44    1.03    0.02    0.14    0.72   43.94  13.29   0.58    0.42
1.26     1.43    1.03    0.02    0.14    0.72   42.07  11.63   0.49    0.35
1.08     1.38    0.99    0.02    0.13    0.72   38.84   9.97    0.39    0.28
0.90     1.27    0.91    0.01    0.11    0.72   33.55   8.31    0.28    0.20
0.72     1.02    0.73    0.01    0.07    0.72   24.67   6.64    0.16    0.12
0.54     0.41    0.29    0.01    0.02    0.72   8.84    4.98    0.04    0.03

```

DATE INSUMATE

Pt[kW]= 5.032021      Parb[kW]= 3.610016      RANDA = .7174087

**Rezultatele din fișierul RVER3 Varianta A**

program RVER.BAS

FISIER REZULTATE:rver3

CODUL TURBINEI Marga

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307      GR= .75

Datele geometrice ale variantei de turbina tehnologizata

lc=a-b\*r;      dr=a1-b1\*r;      betinstgr=a2/r-b2  
a              b              a1              b1              a2              b2  
0.450          0.111          0.300          0.080          25.000          6.000

MARIMI GEOMETRICE PENTRU PALETE

```

*****
r[m]      lc[m]      dr=d/lc[-]      betinstgr
*****
0.540     0.390     0.257     40.296
0.720     0.370     0.242     28.722
0.900     0.350     0.228     21.778
1.080     0.330     0.214     17.148
1.260     0.310     0.199     13.841
1.440     0.290     0.185     11.361
1.620     0.270     0.170     9.432
1.800     0.250     0.156     7.889
1.980     0.230     0.142     6.626
2.160     0.210     0.127     5.574

```

ANV= 5.39973      z= 5      Soliditate: .8842375

\*\*\*\*\*



```

r   u   inc  cyinf  cxinf  winf  winfc  vt   vtc  Grc  betinf  Delpsc  Delpdc
*****
0.54 6.91 0.12 0.41 0.01 12.59 11.13 5.34 1.32 -1.49 40.41 -16.58 27.73
0.72 9.22 6.22 1.02 0.01 14.25 13.38 4.93 2.78 0.23 34.94 7.34 24.05
0.90 11.52 8.82 1.27 0.01 16.03 15.38 4.56 3.03 0.46 30.60 19.51 23.18
1.08 13.82 9.97 1.38 0.02 17.90 17.32 4.22 2.91 0.52 27.12 25.74 23.59
1.26 16.13 10.44 1.43 0.02 19.84 19.29 3.92 2.70 0.54 24.28 28.97 24.33
1.44 18.43 10.58 1.44 0.02 21.84 21.29 3.65 2.46 0.55 21.94 30.47 25.08
1.62 20.74 10.55 1.44 0.02 23.88 23.32 3.41 2.23 0.54 19.98 30.80 25.75
1.80 23.04 10.44 1.43 0.02 25.95 25.39 3.19 2.00 0.53 18.33 30.24 26.33
1.98 25.34 10.28 1.41 0.02 28.06 27.48 3.00 1.80 0.52 16.91 28.93 26.81
2.16 27.65 10.11 1.40 0.02 30.18 29.59 2.82 1.60 0.50 15.68 26.95 27.22
*****

```

#### REZULTATE RANDAMENTE, PUTERI LA ARBORE

```

*****
r[m]      cyinf  cyANV   cxinf   cxANV   RANDA   Dpc   DelQ   DelPt   DelParb
*****
2.16     1.40     1.00     0.02     0.14     0.72   54.17  19.93   1.08     0.77
1.98     1.41     1.01     0.02     0.14     0.72   55.74  18.27   1.02     0.73
1.80     1.43     1.02     0.02     0.14     0.72   56.57  16.61   0.94     0.67
1.62     1.44     1.03     0.02     0.14     0.72   56.55  14.95   0.85     0.61
1.44     1.44     1.03     0.02     0.14     0.72   55.55  13.29   0.74     0.53
1.26     1.43     1.03     0.02     0.14     0.72   53.30  11.63   0.62     0.44
1.08     1.38     0.99     0.02     0.13     0.72   49.33   9.97    0.49     0.35
0.90     1.27     0.91     0.01     0.11     0.72   42.69   8.31    0.35     0.25
0.72     1.02     0.73     0.01     0.07     0.72   31.39   6.64    0.21     0.15
0.54     0.41     0.29     0.01     0.02     0.72   11.14   4.98    0.06     0.04

```

#### DATE INSUMATE

Pt[kW]= 6.351989      Parb[kW]= 4.556969      RANDA = .7174081

### Rezultatele din fișierul RVER4 Varianta A

program RVER.BAS

FISIER REZULTATE:rver4

CODUL TURBINEI Marga

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307      GR= .75

-----

Datele geometrice ale variantei de turbina tehnologizata

lc=a-b\*r;      dr=a1-b1\*r;      betinstgr=a2/r-b2

| a     | b     | a1    | b1    | a2     | b2    |
|-------|-------|-------|-------|--------|-------|
| 0.450 | 0.111 | 0.300 | 0.080 | 25.000 | 6.000 |

#### MARIMI GEOMETRICE PENTRU PALETE

```

*****
r[m]      lc[m]      dr=d/lc[-]      betinstgr
*****
0.540     0.390     0.257     40.296
0.720     0.370     0.242     28.722
0.900     0.350     0.228     21.778
1.080     0.330     0.214     17.148
1.260     0.310     0.199     13.841
1.440     0.290     0.185     11.361
1.620     0.270     0.170     9.432
1.800     0.250     0.156     7.889
1.980     0.230     0.142     6.626
2.160     0.210     0.127     5.574

```

ANV= 5.39973      z= 6      Soliditate: 1.061085

\*\*\*\*\*

```

r   u   inc  cyinf  cxinf  winf  winfc  vt   vtc  Grc  betinf  Delpsc  Delpdc
*****
0.54 6.91 0.12 0.41 0.01 12.59 11.23 5.34 1.59 -1.02 40.41 -13.75 27.23
0.72 9.22 6.22 1.02 0.01 14.25 13.63 4.93 3.40 0.43 34.94 16.65 21.72
0.90 11.52 8.82 1.27 0.01 16.03 15.66 4.56 3.70 0.61 30.60 31.77 20.41
1.08 13.82 9.97 1.38 0.02 17.90 17.61 4.22 3.55 0.65 27.12 39.10 21.06
1.26 16.13 10.44 1.43 0.02 19.84 19.55 3.92 3.28 0.66 24.28 42.64 22.19
1.44 18.43 10.58 1.44 0.02 21.84 21.53 3.65 2.99 0.65 21.94 44.09 23.33
1.62 20.74 10.55 1.44 0.02 23.88 23.54 3.41 2.70 0.64 19.98 44.17 24.33
1.80 23.04 10.44 1.43 0.02 25.95 25.59 3.19 2.42 0.63 18.33 43.23 25.19
1.98 25.34 10.28 1.41 0.02 28.06 27.66 3.00 2.17 0.62 16.91 41.42 25.91
2.16 27.65 10.11 1.40 0.02 30.18 29.75 2.82 1.93 0.59 15.68 38.84 26.51
*****

```

REZULTATE RANDAMENTE, PUTERI LA ARBORE

```

*****
r[m]   cyinf  cyANV  cxinf  cxANV  RANDA  Dpc  DelQ  DelPt  DelParb
*****
2.16   1.40   1.00   0.02   0.14   0.72  65.35 19.93  1.30   0.93
1.98   1.41   1.01   0.02   0.14   0.72  67.33 18.27  1.23   0.88
1.80   1.43   1.02   0.02   0.14   0.72  68.41 16.61  1.14   0.82
1.62   1.44   1.03   0.02   0.14   0.72  68.51 14.95  1.02   0.73
1.44   1.44   1.03   0.02   0.14   0.72  67.42 13.29  0.90   0.64
1.26   1.43   1.03   0.02   0.14   0.72  64.84 11.63  0.75   0.54
1.08   1.38   0.99   0.02   0.13   0.72  60.16  9.97  0.60   0.43
0.90   1.27   0.91   0.01   0.11   0.72  52.19  8.31  0.43   0.31
0.72   1.02   0.73   0.01   0.07   0.72  38.36  6.64  0.25   0.18
0.54   0.41   0.29   0.01   0.02   0.72  13.49  4.98  0.07   0.05

```

DATE INSUMATE

Pt[kW]= 7.698729      Parb[kW]= 5.523128      RANDA = .7174078

**Rezultatele din fișierul RVER5 Varianta B**

program RVER.BAS

FISIER REZULTATE:rver5

CODUL TURBINEI Marga /B

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307      GR= .75

Datele geometrice ale variantei de turbina tehnologizata

lc=a-b\*r;      dr=a1-b1\*r;      betinstgr=a2/r-b2  
a              b              a1              b1              a2              b2  
0.550          0.111          0.300          0.080          15.000          2.000

MARIMI GEOMETRICE PENTRU PALETE

```

*****
r[m]   lc[m]   dr=d/lc[-]   betinstgr
*****
0.540   0.490   0.257   25.778
0.720   0.470   0.242   18.833
0.900   0.450   0.228   14.667
1.080   0.430   0.214   11.889
1.260   0.410   0.199   9.905
1.440   0.390   0.185   8.417
1.620   0.370   0.170   7.259
1.800   0.350   0.156   6.333
1.980   0.330   0.142   5.576
2.160   0.310   0.127   4.944

```

ANV= 4.049848                      z= 3                      Soliditate: .7073812

\*\*\*\*\*



```

r   u   inc  cyinf  cxinf  winf  winfc  vt   vtc  Grc  betinf  Delpsc  Delpdc
*****
0.54 6.91 14.64 1.83 0.03 12.59 13.23 5.34 6.99 1.02 40.41 60.41 -1.18
0.72 9.22 16.11 1.97 0.03 14.25 14.70 4.93 6.01 0.90 34.94 61.27 6.63
0.90 11.52 15.93 1.95 0.03 16.03 16.24 4.56 5.05 0.82 30.60 58.09 13.17
1.08 13.82 15.23 1.89 0.03 17.90 17.93 4.22 4.29 0.76 27.12 55.09 17.53
1.26 16.13 14.38 1.81 0.02 19.84 19.74 3.92 3.69 0.72 24.28 52.53 20.43
1.44 18.43 13.52 1.73 0.02 21.84 21.64 3.65 3.22 0.69 21.94 50.22 22.44
1.62 20.74 12.72 1.65 0.02 23.88 23.61 3.41 2.83 0.67 19.98 47.99 23.89
1.80 23.04 11.99 1.58 0.02 25.95 25.63 3.19 2.50 0.65 18.33 45.72 24.95
1.98 25.34 11.33 1.52 0.02 28.06 27.69 3.00 2.23 0.63 16.91 43.34 25.76
2.16 27.65 10.74 1.46 0.02 30.18 29.78 2.82 1.98 0.61 15.68 40.80 26.38
*****

```

REZULTATE RANDAMENTE, PUTERI LA ARBORE

```

*****
r[m]   cyinf  cyANV  cxinf  cxANV  RANDA  Dpc  DelQ  DelPt  DelParb
*****
2.16   1.46   0.96   0.02   0.19   0.66  67.18 19.93  1.34   0.88
1.98   1.52   0.99   0.02   0.21   0.66  69.09 18.27  1.26   0.83
1.80   1.58   1.04   0.02   0.22   0.66  70.67 16.61  1.17   0.77
1.62   1.65   1.08   0.02   0.24   0.66  71.87 14.95  1.07   0.71
1.44   1.73   1.13   0.02   0.27   0.66  72.66 13.29  0.97   0.63
1.26   1.81   1.19   0.02   0.29   0.66  72.97 11.63  0.85   0.56
1.08   1.89   1.24   0.03   0.32   0.66  72.62 9.97   0.72   0.48
0.90   1.95   1.29   0.03   0.34   0.66  71.26 8.31   0.59   0.39
0.72   1.97   1.30   0.03   0.35   0.66  67.90 6.64   0.45   0.30
0.54   1.83   1.20   0.03   0.30   0.66  59.23 4.98   0.30   0.19

```

DATE INSUMATE

Pt[kW]= 8.726224      Parb[kW]= 5.73088      RANDA = .6567423

**Rezultatele din fișierul RVER7 Varianta B**

program RVER.BAS

FISIER REZULTATE:rver7

CODUL TURBINEI Marga /B

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307      GR= .75

Datele geometrice ale variantei de turbina tehnologizata

lc=a-b\*r;      dr=a1-b1\*r;      betinstgr=a2/r-b2  
a      b      a1      b1      a2      b2  
0.550   0.111   0.300   0.080   15.000   2.000

MARIMI GEOMETRICE PENTRU PALETE

```

*****
r[m]   lc[m]   dr=d/lc[-]   betinstgr
*****
0.540   0.490   0.257   25.778
0.720   0.470   0.242   18.833
0.900   0.450   0.228   14.667
1.080   0.430   0.214   11.889
1.260   0.410   0.199   9.905
1.440   0.390   0.185   8.417
1.620   0.370   0.170   7.259
1.800   0.350   0.156   6.333
1.980   0.330   0.142   5.576
2.160   0.310   0.127   4.944

```

ANV= 4.049848      z= 5      Soliditate: 1.178969

r u inc cyinf cxinf winf winfc vt vtc Grc betinf Delpsc Delpdc

```
*****
0.54  6.91 14.64  1.83  0.03 12.59 14.18  5.34  9.38  1.32 40.41 104.44 -25.05
0.72  9.22 16.11  1.97  0.03 14.25 15.50  4.93  7.93  1.11 34.94  99.26  -9.73
0.90 11.52 15.93  1.95  0.03 16.03 16.90  4.56  6.57  0.97 30.60  90.35   2.36
1.08 13.82 15.23  1.89  0.03 17.90 18.49  4.22  5.53  0.89 27.12  83.49  10.09
1.26 16.13 14.38  1.81  0.02 19.84 20.21  3.92  4.73  0.84 24.28  78.28  15.10
1.44 18.43 13.52  1.73  0.02 21.84 22.05  3.65  4.10  0.80 21.94  74.05  18.50
1.62 20.74 12.72  1.65  0.02 23.88 23.96  3.41  3.59  0.77 19.98  70.31  20.89
1.80 23.04 11.99  1.58  0.02 25.95 25.94  3.19  3.17  0.75 18.33  66.78  22.64
1.98 25.34 11.33  1.52  0.02 28.06 27.97  3.00  2.81  0.73 16.91  63.28  23.95
2.16 27.65 10.74  1.46  0.02 30.18 30.03  2.82  2.50  0.71 15.68  59.71  24.96
*****
```

REZULTATE RANDAMENTE, PUTERI LA ARBORE

```
*****
r[m]      cyinf  cyANV   cxinf   cxANV   RANDA   Dpc    DelQ    DelPt   DelParb
*****
2.16     1.46    0.96    0.02    0.19    0.66   84.67   19.93    1.69    1.11
1.98     1.52    0.99    0.02    0.21    0.66   87.24   18.27    1.59    1.05
1.80     1.58    1.04    0.02    0.22    0.66   89.42   16.61    1.49    0.97
1.62     1.65    1.08    0.02    0.24    0.66   91.20   14.95    1.36    0.90
1.44     1.73    1.13    0.02    0.27    0.66   92.54   13.29    1.23    0.81
1.26     1.81    1.19    0.02    0.29    0.66   93.39   11.63    1.09    0.71
1.08     1.89    1.24    0.03    0.32    0.66   93.57    9.97    0.93    0.61
0.90     1.95    1.29    0.03    0.34    0.66   92.71    8.31    0.77    0.51
0.72     1.97    1.30    0.03    0.35    0.66   89.53    6.64    0.59    0.39
0.54     1.83    1.20    0.03    0.30    0.66   79.39    4.98    0.40    0.26
*****
```

DATE INSUMATE

Pt[kW]= 11.13978      Parb[kW]= 7.316063      RANDA = .6567512

**Rezultatele din fișierul RVER8 Varianta B**

program RVER.BAS

FISIER REZULTATE:rver8

CODUL TURBINEI Marga /B

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307      GR= .75

Datele geometrice ale variantei de turbina tehnologizata

lc=a-b\*r;      dr=a1-b1\*r;      betinstgr=a2/r-b2  
a              b              a1              b1              a2              b2  
0.550          0.111          0.300          0.080          15.000          2.000

MARIMI GEOMETRICE PENTRU PALETE

```
*****
r[m]      lc[m]      dr=d/lc[-]      betinstgr
*****
0.540     0.490     0.257     25.778
0.720     0.470     0.242     18.833
0.900     0.450     0.228     14.667
1.080     0.430     0.214     11.889
1.260     0.410     0.199     9.905
1.440     0.390     0.185     8.417
1.620     0.370     0.170     7.259
1.800     0.350     0.156     6.333
1.980     0.330     0.142     5.576
2.160     0.310     0.127     4.944
*****
```

ANV= 4.049848                      z= 6                      Soliditate: 1.414762

```
*****
r    u    inc  cyinf  cxinf  winf  winfc  vt    vtc  Grc  betinf  Delpsc  Delpdc
*****
```

|      |       |       |      |      |       |       |      |       |      |       |        |        |
|------|-------|-------|------|------|-------|-------|------|-------|------|-------|--------|--------|
| 0.54 | 6.91  | 14.64 | 1.83 | 0.03 | 12.59 | 15.35 | 5.34 | 12.18 | 1.60 | 40.41 | 165.11 | -62.02 |
| 0.72 | 9.22  | 16.11 | 1.97 | 0.03 | 14.25 | 16.43 | 4.93 | 10.08 | 1.29 | 34.94 | 147.36 | -33.50 |
| 0.90 | 11.52 | 15.93 | 1.95 | 0.03 | 16.03 | 17.63 | 4.56 | 8.22  | 1.11 | 30.60 | 128.67 | -12.63 |
| 1.08 | 13.82 | 15.23 | 1.89 | 0.03 | 17.90 | 19.08 | 4.22 | 6.84  | 1.00 | 27.12 | 115.79 | 0.10   |
| 1.26 | 16.13 | 14.38 | 1.81 | 0.02 | 19.84 | 20.71 | 3.92 | 5.81  | 0.93 | 24.28 | 106.72 | 8.10   |
| 1.44 | 18.43 | 13.52 | 1.73 | 0.02 | 21.84 | 22.47 | 3.65 | 5.01  | 0.88 | 21.94 | 99.80  | 13.39  |
| 1.62 | 20.74 | 12.72 | 1.65 | 0.02 | 23.88 | 24.33 | 3.41 | 4.37  | 0.85 | 19.98 | 94.06  | 17.07  |
| 1.80 | 23.04 | 11.99 | 1.58 | 0.02 | 25.95 | 26.26 | 3.19 | 3.85  | 0.82 | 18.33 | 88.93  | 19.71  |
| 1.98 | 25.34 | 11.33 | 1.52 | 0.02 | 28.06 | 28.25 | 3.00 | 3.41  | 0.79 | 16.91 | 84.07  | 21.68  |
| 2.16 | 27.65 | 10.74 | 1.46 | 0.02 | 30.18 | 30.28 | 2.82 | 3.03  | 0.77 | 15.68 | 79.28  | 23.18  |

\*\*\*\*\*

## REZULTATE RANDAMENTE, PUTERI LA ARBORE

\*\*\*\*\*

| r[m] | cyinf | cyANV | cxinf | cxANV | RANDA | Dpc     | DelQ  | DelPt | DelParb |
|------|-------|-------|-------|-------|-------|---------|-------|-------|---------|
| 2.16 | 1.46  | 0.96  | 0.02  | 0.19  | 0.66  | %102.46 | 19.93 | 2.04  | 1.34    |
| 1.98 | 1.52  | 0.99  | 0.02  | 0.21  | 0.66  | %105.75 | 18.27 | 1.93  | 1.27    |
| 1.80 | 1.58  | 1.04  | 0.02  | 0.22  | 0.66  | %108.64 | 16.61 | 1.80  | 1.18    |
| 1.62 | 1.65  | 1.08  | 0.02  | 0.24  | 0.66  | %111.13 | 14.95 | 1.66  | 1.09    |
| 1.44 | 1.73  | 1.13  | 0.02  | 0.27  | 0.66  | %113.20 | 13.29 | 1.50  | 0.99    |
| 1.26 | 1.81  | 1.19  | 0.02  | 0.29  | 0.66  | %114.82 | 11.63 | 1.34  | 0.88    |
| 1.08 | 1.89  | 1.24  | 0.03  | 0.32  | 0.66  | %115.89 | 9.97  | 1.16  | 0.76    |
| 0.90 | 1.95  | 1.29  | 0.03  | 0.34  | 0.66  | %116.04 | 8.31  | 0.96  | 0.63    |
| 0.72 | 1.97  | 1.30  | 0.03  | 0.35  | 0.66  | %113.85 | 6.64  | 0.76  | 0.50    |
| 0.54 | 1.83  | 1.20  | 0.03  | 0.30  | 0.66  | %103.10 | 4.98  | 0.51  | 0.34    |

## DATE INSUMATE

Pt[kW]= 13.66973      Parb[kW]= 8.977744      RANDA = .6567611

**Rezultatele din fișierul RVER9 Varianta C**

program RVER.BAS

FISIER REZULTATE:rver9

CODUL TURBINEI Marga

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307      GR= .75

Datele geometrice ale variantei de turbina tehnologizata

$$lc=a-b*r; \quad dr=a1-b1*r; \quad betinstgr=a2/r-b2$$

| a     | b     | a1    | b1    | a2     | b2    |
|-------|-------|-------|-------|--------|-------|
| 0.450 | 0.111 | 0.300 | 0.080 | 15.000 | 2.000 |

MARIMI GEOMETRICE PENTRU PALETE

\*\*\*\*\*

| r[m]  | lc[m] | dr=d/lc[-] | betinstgr |
|-------|-------|------------|-----------|
| 0.540 | 0.390 | 0.257      | 25.778    |
| 0.720 | 0.370 | 0.242      | 18.833    |
| 0.900 | 0.350 | 0.228      | 14.667    |
| 1.080 | 0.330 | 0.214      | 11.889    |
| 1.260 | 0.310 | 0.199      | 9.905     |
| 1.440 | 0.290 | 0.185      | 8.417     |
| 1.620 | 0.270 | 0.170      | 7.259     |
| 1.800 | 0.250 | 0.156      | 6.333     |
| 1.980 | 0.230 | 0.142      | 5.576     |
| 2.160 | 0.210 | 0.127      | 4.944     |

\*\*\*\*\*

ANV= 5.39973      z= 3      Soliditate: .5305426

\*\*\*\*\*

| r    | u    | inc   | cyinf | cxinf | winf  | winf_c | vt   | vtc  | Grc  | betinf | Delpsc | Delpdc |
|------|------|-------|-------|-------|-------|--------|------|------|------|--------|--------|--------|
| 0.54 | 6.91 | 14.64 | 1.83  | 0.03  | 12.59 | 12.01  | 5.34 | 3.79 | 0.38 | 40.41  | 12.10  | 19.99  |

|      |       |       |      |      |       |       |      |      |      |       |       |       |
|------|-------|-------|------|------|-------|-------|------|------|------|-------|-------|-------|
| 0.72 | 9.22  | 16.11 | 1.97 | 0.03 | 14.25 | 13.58 | 4.93 | 3.28 | 0.40 | 34.94 | 14.86 | 22.19 |
| 0.90 | 11.52 | 15.93 | 1.95 | 0.03 | 16.03 | 15.27 | 4.56 | 2.77 | 0.38 | 30.60 | 14.98 | 24.09 |
| 1.08 | 13.82 | 15.23 | 1.89 | 0.03 | 17.90 | 17.08 | 4.22 | 2.35 | 0.36 | 27.12 | 14.40 | 25.41 |
| 1.26 | 16.13 | 14.38 | 1.81 | 0.02 | 19.84 | 18.98 | 3.92 | 2.01 | 0.34 | 24.28 | 13.48 | 26.31 |
| 1.44 | 18.43 | 13.52 | 1.73 | 0.02 | 21.84 | 20.96 | 3.65 | 1.74 | 0.31 | 21.94 | 12.31 | 26.94 |
| 1.62 | 20.74 | 12.72 | 1.65 | 0.02 | 23.88 | 22.99 | 3.41 | 1.51 | 0.28 | 19.98 | 10.91 | 27.40 |
| 1.80 | 23.04 | 11.99 | 1.58 | 0.02 | 25.95 | 25.06 | 3.19 | 1.31 | 0.25 | 18.33 | 9.29  | 27.73 |
| 1.98 | 25.34 | 11.33 | 1.52 | 0.02 | 28.06 | 27.17 | 3.00 | 1.14 | 0.21 | 16.91 | 7.45  | 27.99 |
| 2.16 | 27.65 | 10.74 | 1.46 | 0.02 | 30.18 | 29.30 | 2.82 | 0.99 | 0.16 | 15.68 | 5.40  | 28.19 |

\*\*\*\*\*

#### REZULTATE RANDAMENTE, PUTERI LA ARBORE

\*\*\*\*\*

| r[m] | cyinf | cyANV | cxinf | cxANV | RANDA | Dpc   | DelQ  | DelPt | DelParb |
|------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| 2.16 | 1.46  | 1.05  | 0.02  | 0.15  | 0.72  | 33.58 | 19.93 | 0.67  | 0.48    |
| 1.98 | 1.52  | 1.09  | 0.02  | 0.16  | 0.72  | 35.44 | 18.27 | 0.65  | 0.46    |
| 1.80 | 1.58  | 1.13  | 0.02  | 0.17  | 0.72  | 37.02 | 16.61 | 0.62  | 0.44    |
| 1.62 | 1.65  | 1.18  | 0.02  | 0.19  | 0.72  | 38.30 | 14.95 | 0.57  | 0.41    |
| 1.44 | 1.73  | 1.24  | 0.02  | 0.21  | 0.72  | 39.24 | 13.29 | 0.52  | 0.37    |
| 1.26 | 1.81  | 1.30  | 0.02  | 0.23  | 0.72  | 39.78 | 11.63 | 0.46  | 0.33    |
| 1.08 | 1.89  | 1.36  | 0.03  | 0.25  | 0.72  | 39.80 | 9.97  | 0.40  | 0.29    |
| 0.90 | 1.95  | 1.41  | 0.03  | 0.26  | 0.72  | 39.07 | 8.31  | 0.32  | 0.23    |
| 0.72 | 1.97  | 1.42  | 0.03  | 0.27  | 0.72  | 37.05 | 6.64  | 0.25  | 0.18    |
| 0.54 | 1.83  | 1.32  | 0.03  | 0.23  | 0.72  | 32.09 | 4.98  | 0.16  | 0.11    |

DATE INSUMATE

Pt[kW]= 4.616325      Parb[kW]= 3.316398      RANDA = .7184065

#### Rezultatele din fișierul RVER10 Varianta C

program RVER.BAS

FISIER REZULTATE:rver10

CODUL TURBINEI Marga

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307      GR= .75

Datele geometrice ale variantei de turbina tehnologizata

lc=a-b\*r;      dr=a1-b1\*r;      betinstgr=a2/r-b2  
a      b      a1      b1      a2      b2  
0.450      0.111      0.300      0.080      15.000      2.000

MARIMI GEOMETRICE PENTRU PALETE

\*\*\*\*\*

| r[m]  | lc[m] | dr=d/lc[-] | betinstgr |
|-------|-------|------------|-----------|
| 0.540 | 0.390 | 0.257      | 25.778    |
| 0.720 | 0.370 | 0.242      | 18.833    |
| 0.900 | 0.350 | 0.228      | 14.667    |
| 1.080 | 0.330 | 0.214      | 11.889    |
| 1.260 | 0.310 | 0.199      | 9.905     |
| 1.440 | 0.290 | 0.185      | 8.417     |
| 1.620 | 0.270 | 0.170      | 7.259     |
| 1.800 | 0.250 | 0.156      | 6.333     |
| 1.980 | 0.230 | 0.142      | 5.576     |
| 2.160 | 0.210 | 0.127      | 4.944     |

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ANV= 5.39973      z= 4      Soliditate: .70739

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| r    | u    | inc   | cyinf | cxinf | winf  | winf c | vt   | vtc  | Grc  | betinf | Delpsc | Delpdc |
|------|------|-------|-------|-------|-------|--------|------|------|------|--------|--------|--------|
| 0.54 | 6.91 | 14.64 | 1.83  | 0.03  | 12.59 | 12.57  | 5.34 | 5.29 | 0.74 | 40.41  | 33.14  | 11.65  |
| 0.72 | 9.22 | 16.11 | 1.97  | 0.03  | 14.25 | 14.09  | 4.93 | 4.54 | 0.68 | 34.94  | 35.08  | 16.17  |

|      |       |       |      |      |       |       |      |      |      |       |       |       |
|------|-------|-------|------|------|-------|-------|------|------|------|-------|-------|-------|
| 0.90 | 11.52 | 15.93 | 1.95 | 0.03 | 16.03 | 15.71 | 4.56 | 3.80 | 0.63 | 30.60 | 33.64 | 19.96 |
| 1.08 | 13.82 | 15.23 | 1.89 | 0.03 | 17.90 | 17.45 | 4.22 | 3.20 | 0.59 | 27.12 | 31.73 | 22.51 |
| 1.26 | 16.13 | 14.38 | 1.81 | 0.02 | 19.84 | 19.30 | 3.92 | 2.73 | 0.55 | 24.28 | 29.73 | 24.22 |
| 1.44 | 18.43 | 13.52 | 1.73 | 0.02 | 21.84 | 21.24 | 3.65 | 2.35 | 0.52 | 21.94 | 27.62 | 25.41 |
| 1.62 | 20.74 | 12.72 | 1.65 | 0.02 | 23.88 | 23.23 | 3.41 | 2.03 | 0.49 | 19.98 | 25.36 | 26.26 |
| 1.80 | 23.04 | 11.99 | 1.58 | 0.02 | 25.95 | 25.28 | 3.19 | 1.76 | 0.46 | 18.33 | 22.90 | 26.88 |
| 1.98 | 25.34 | 11.33 | 1.52 | 0.02 | 28.06 | 27.36 | 3.00 | 1.53 | 0.43 | 16.91 | 20.23 | 27.35 |
| 2.16 | 27.65 | 10.74 | 1.46 | 0.02 | 30.18 | 29.47 | 2.82 | 1.33 | 0.38 | 15.68 | 17.32 | 27.71 |

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#### REZULTATE RANDAMENTE, PUTERI LA ARBORE

| r[m] | cyinf | cyANV | cxinf | cxANV | RANDA | Dpc   | DelQ  | DelPt | DelParb |
|------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| 2.16 | 1.46  | 1.05  | 0.02  | 0.15  | 0.72  | 45.03 | 19.93 | 0.90  | 0.64    |
| 1.98 | 1.52  | 1.09  | 0.02  | 0.16  | 0.72  | 47.58 | 18.27 | 0.87  | 0.62    |
| 1.80 | 1.58  | 1.13  | 0.02  | 0.17  | 0.72  | 49.79 | 16.61 | 0.83  | 0.59    |
| 1.62 | 1.65  | 1.18  | 0.02  | 0.19  | 0.72  | 51.62 | 14.95 | 0.77  | 0.55    |
| 1.44 | 1.73  | 1.24  | 0.02  | 0.21  | 0.72  | 53.03 | 13.29 | 0.70  | 0.51    |
| 1.26 | 1.81  | 1.30  | 0.02  | 0.23  | 0.72  | 53.95 | 11.63 | 0.63  | 0.45    |
| 1.08 | 1.89  | 1.36  | 0.03  | 0.25  | 0.72  | 54.23 | 9.97  | 0.54  | 0.39    |
| 0.90 | 1.95  | 1.41  | 0.03  | 0.26  | 0.72  | 53.59 | 8.31  | 0.45  | 0.32    |
| 0.72 | 1.97  | 1.42  | 0.03  | 0.27  | 0.72  | 51.25 | 6.64  | 0.34  | 0.25    |
| 0.54 | 1.83  | 1.32  | 0.03  | 0.23  | 0.72  | 44.79 | 4.98  | 0.22  | 0.16    |

#### DATE INSUMATE

Pt[kW]= 6.247236      Parb[kW]= 4.488091      RANDA = .7184121

### Rezultatele din fișierul RVER11 Varianta C

program RVER.BAS

FISIER REZULTATE:rver11

CODUL TURBINEI Marga

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307      GR= .75

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Datele geomatrice ale variantei de turbina tehnologizata

lc=a-b\*r;      dr=a1-b1\*r;      betinstgr=a2/r-b2

| a     | b     | a1    | b1    | a2     | b2    |
|-------|-------|-------|-------|--------|-------|
| 0.450 | 0.111 | 0.300 | 0.080 | 15.000 | 2.000 |

MARIMI GEOMETRICE PENTRU PALETE

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| r[m]  | lc[m] | dr=d/lc[-] | betinstgr |
|-------|-------|------------|-----------|
| 0.540 | 0.390 | 0.257      | 25.778    |
| 0.720 | 0.370 | 0.242      | 18.833    |
| 0.900 | 0.350 | 0.228      | 14.667    |
| 1.080 | 0.330 | 0.214      | 11.889    |
| 1.260 | 0.310 | 0.199      | 9.905     |
| 1.440 | 0.290 | 0.185      | 8.417     |
| 1.620 | 0.270 | 0.170      | 7.259     |
| 1.800 | 0.250 | 0.156      | 6.333     |
| 1.980 | 0.230 | 0.142      | 5.576     |
| 2.160 | 0.210 | 0.127      | 4.944     |

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ANV= 5.397301      z= 5      Soliditate: .8846354

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| r    | u     | inc   | cyinf | cxinf | winf  | winfC | vt   | vtc  | Grc  | betinf | Delpsc | Delpdc |
|------|-------|-------|-------|-------|-------|-------|------|------|------|--------|--------|--------|
| 0.54 | 6.91  | 14.64 | 1.83  | 0.03  | 12.59 | 13.21 | 5.34 | 6.95 | 1.01 | 40.41  | 59.66  | -0.81  |
| 0.72 | 9.22  | 16.11 | 1.97  | 0.03  | 14.25 | 14.65 | 4.93 | 5.90 | 0.89 | 34.94  | 59.15  | 7.46   |
| 0.90 | 11.52 | 15.93 | 1.95  | 0.03  | 16.03 | 16.17 | 4.56 | 4.89 | 0.80 | 30.60  | 54.87  | 14.14  |

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|------|-------|-------|------|------|-------|-------|------|------|------|-------|-------|-------|
| 1.08 | 13.82 | 15.23 | 1.89 | 0.03 | 17.90 | 17.85 | 4.22 | 4.10 | 0.73 | 27.12 | 50.84 | 18.52 |
| 1.26 | 16.13 | 14.38 | 1.81 | 0.02 | 19.84 | 19.64 | 3.92 | 3.47 | 0.69 | 24.28 | 47.25 | 21.39 |
| 1.44 | 18.43 | 13.52 | 1.73 | 0.02 | 21.84 | 21.53 | 3.65 | 2.98 | 0.65 | 21.94 | 43.87 | 23.36 |
| 1.62 | 20.74 | 12.72 | 1.65 | 0.02 | 23.88 | 23.48 | 3.41 | 2.57 | 0.62 | 19.98 | 40.51 | 24.75 |
| 1.80 | 23.04 | 11.99 | 1.58 | 0.02 | 25.95 | 25.49 | 3.19 | 2.23 | 0.59 | 18.33 | 37.06 | 25.75 |
| 1.98 | 25.34 | 11.33 | 1.52 | 0.02 | 28.06 | 27.55 | 3.00 | 1.93 | 0.56 | 16.91 | 33.44 | 26.51 |
| 2.16 | 27.65 | 10.74 | 1.46 | 0.02 | 30.18 | 29.63 | 2.82 | 1.67 | 0.52 | 15.68 | 29.58 | 27.07 |

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#### REZULTATE RANDAMENTE, PUTERI LA ARBORE

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| r[m] | cyinf | cyANV | cxinf | cxANV | RANDA | Dpc   | DelQ  | DelPt | DelParb |
|------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| 2.16 | 1.46  | 1.05  | 0.02  | 0.15  | 0.72  | 56.66 | 19.93 | 1.13  | 0.81    |
| 1.98 | 1.52  | 1.09  | 0.02  | 0.16  | 0.72  | 59.94 | 18.27 | 1.10  | 0.79    |
| 1.80 | 1.58  | 1.13  | 0.02  | 0.17  | 0.72  | 62.82 | 16.61 | 1.04  | 0.75    |
| 1.62 | 1.65  | 1.18  | 0.02  | 0.19  | 0.72  | 65.26 | 14.95 | 0.98  | 0.70    |
| 1.44 | 1.73  | 1.24  | 0.02  | 0.21  | 0.72  | 67.23 | 13.29 | 0.89  | 0.64    |
| 1.26 | 1.81  | 1.30  | 0.02  | 0.23  | 0.72  | 68.64 | 11.63 | 0.80  | 0.57    |
| 1.08 | 1.89  | 1.36  | 0.03  | 0.25  | 0.72  | 69.35 | 9.97  | 0.69  | 0.50    |
| 0.90 | 1.95  | 1.41  | 0.03  | 0.26  | 0.72  | 69.01 | 8.31  | 0.57  | 0.41    |
| 0.72 | 1.97  | 1.42  | 0.03  | 0.27  | 0.72  | 66.62 | 6.64  | 0.44  | 0.32    |
| 0.54 | 1.83  | 1.32  | 0.03  | 0.23  | 0.72  | 58.86 | 4.98  | 0.29  | 0.21    |

#### DATE INSUMATE

Pt[kW]= 7.935894      Parb[kW]= 5.700566      RANDA = .718327

### Rezultatele din fișierul RVER12 Varianta C

program RVER.BAS

FISIER REZULTATE:rver12

CODUL TURBINEI Marga

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ; uR[m/s]= 28.8 ; v1[m/s]= 9.6 ; RO[kg/m3]= 1.225 ; kv3a= .7 ; PC[kW]= 8.618307      GR= .75

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Datele geometrice ale variantei de turbina tehnologizata

lc=a-b\*r;      dr=a1-b1\*r;      betinstgr=a2/r-b2

| a     | b     | a1    | b1    | a2     | b2    |
|-------|-------|-------|-------|--------|-------|
| 0.450 | 0.111 | 0.300 | 0.080 | 15.000 | 2.000 |

MARIMI GEOMETRICE PENTRU PALETE

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| r[m]  | lc[m] | dr=d/lc[-] | betinstgr |
|-------|-------|------------|-----------|
| 0.540 | 0.390 | 0.257      | 25.778    |
| 0.720 | 0.370 | 0.242      | 18.833    |
| 0.900 | 0.350 | 0.228      | 14.667    |
| 1.080 | 0.330 | 0.214      | 11.889    |
| 1.260 | 0.310 | 0.199      | 9.905     |
| 1.440 | 0.290 | 0.185      | 8.417     |
| 1.620 | 0.270 | 0.170      | 7.259     |
| 1.800 | 0.250 | 0.156      | 6.333     |
| 1.980 | 0.230 | 0.142      | 5.576     |
| 2.160 | 0.210 | 0.127      | 4.944     |

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ANV= 5.39973      z= 6      Soliditate: 1.061085

\*\*\*\*\*

| r    | u     | inc   | cyinf | cxinf | winf  | winf_c | vt   | vtc  | Grc  | betinf | Delpsc | Delpdc |
|------|-------|-------|-------|-------|-------|--------|------|------|------|--------|--------|--------|
| 0.54 | 6.91  | 14.64 | 1.83  | 0.03  | 12.59 | 13.95  | 5.34 | 8.81 | 1.25 | 40.41  | 93.33  | -18.74 |
| 0.72 | 9.22  | 16.11 | 1.97  | 0.03  | 14.25 | 15.27  | 4.93 | 7.38 | 1.05 | 34.94  | 87.86  | -4.56  |
| 0.90 | 11.52 | 15.93 | 1.95  | 0.03  | 16.03 | 16.68  | 4.56 | 6.05 | 0.93 | 30.60  | 78.98  | 6.38   |
| 1.08 | 13.82 | 15.23 | 1.89  | 0.03  | 17.90 | 18.26  | 4.22 | 5.03 | 0.84 | 27.12  | 71.83  | 13.31  |

```

1.26 16.13 14.38 1.81 0.02 19.84 19.99 3.92 4.24 0.79 24.28 66.03 17.77
1.44 18.43 13.52 1.73 0.02 21.84 21.83 3.65 3.62 0.75 21.94 60.99 20.76
1.62 20.74 12.72 1.65 0.02 23.88 23.74 3.41 3.11 0.71 19.98 56.27 22.85
1.80 23.04 11.99 1.58 0.02 25.95 25.72 3.19 2.69 0.68 18.33 51.63 24.35
1.98 25.34 11.33 1.52 0.02 28.06 27.74 3.00 2.33 0.65 16.91 46.91 25.46
2.16 27.65 10.74 1.46 0.02 30.18 29.80 2.82 2.02 0.61 15.68 42.00 26.30

```

REZULTATE RANDAMENTE, PUTERI LA ARBORE

```

*****
r[m]      cyinf  cyANV   cxinf   cxANV   RANDA   Dpc     DelQ    DelPt   DelParb
*****
2.16      1.46    1.05    0.02    0.15    0.72    68.30   19.93   1.36    0.98
1.98      1.52    1.09    0.02    0.16    0.72    72.37   18.27   1.32    0.95
1.80      1.58    1.13    0.02    0.17    0.72    75.98   16.61   1.26    0.91
1.62      1.65    1.18    0.02    0.19    0.72    79.12   14.95   1.18    0.85
1.44      1.73    1.24    0.02    0.21    0.72    81.75   13.29   1.09    0.78
1.26      1.81    1.30    0.02    0.23    0.72    83.80   11.63   0.97    0.70
1.08      1.89    1.36    0.03    0.25    0.72    85.14   9.97    0.85    0.61
0.90      1.95    1.41    0.03    0.26    0.72    85.36   8.31    0.71    0.51
0.72      1.97    1.42    0.03    0.27    0.72    83.30   6.64    0.55    0.40
0.54      1.83    1.32    0.03    0.23    0.72    74.59   4.98    0.37    0.27

```

DATE INSUMATE

Pt[kW]= 9.672482      Parb[kW]= 6.94895      RANDA = .7184247

**Rezultatele din fișierul RVER13 Varianta D**

program RVER.BAS

FISIER REZULTATE:RVER13

CODUL TURBINEI Marga

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307 GR= .75

Datele geometrice ale variantei de turbina tehnologizata

```

lc=a-b*r;      dr=a1-b1*r;      betinstgr=a2/r-b2
a      b      a1      b1      a2      b2
0.550  0.111  0.300  0.080  25.000  6.000

```

MARIMI GEOMETRICE PENTRU PALETE

```

*****
r[m]      lc[m]      dr=d/lc[-]      betinstgr
*****
0.540      0.490      0.257      40.296
0.720      0.470      0.242      28.722
0.900      0.450      0.228      21.778
1.080      0.430      0.214      17.148
1.260      0.410      0.199      13.841
1.440      0.390      0.185      11.361
1.620      0.370      0.170      9.432
1.800      0.350      0.156      7.889
1.980      0.330      0.142      6.626
2.160      0.310      0.127      5.574

```

ANV= 4.049848      z= 3      Soliditate: .7073812

```

r      u      inc  cyinf  cxinf  winf  winfc  vt  vtc  Grc  betinf  Delpsc  Delpdc
*****
0.54  6.91  0.12  0.41  0.01  12.59  11.02  5.34  0.98 -2.39  40.41 -19.88  28.20
0.72  9.22  6.22  1.02  0.01  14.25  13.10  4.93  2.08 -0.12  34.94 -2.72  26.15
0.90  11.52  8.82  1.27  0.01  16.03  15.06  4.56  2.29  0.21  30.60  6.68  25.59
1.08  13.82  9.97  1.38  0.02  17.90  17.03  4.22  2.24  0.32  27.12  12.18  25.72
1.26  16.13  10.44  1.43  0.02  19.84  19.02  3.92  2.11  0.38  24.28  15.65  26.06

```

|      |       |       |      |      |       |       |      |      |      |       |       |       |
|------|-------|-------|------|------|-------|-------|------|------|------|-------|-------|-------|
| 1.44 | 18.43 | 10.58 | 1.44 | 0.02 | 21.84 | 21.06 | 3.65 | 1.96 | 0.40 | 21.94 | 17.91 | 26.43 |
| 1.62 | 20.74 | 10.55 | 1.44 | 0.02 | 23.88 | 23.13 | 3.41 | 1.82 | 0.42 | 19.98 | 19.35 | 26.77 |
| 1.80 | 23.04 | 10.44 | 1.43 | 0.02 | 25.95 | 25.23 | 3.19 | 1.67 | 0.43 | 18.33 | 20.15 | 27.07 |
| 1.98 | 25.34 | 10.28 | 1.41 | 0.02 | 28.06 | 27.36 | 3.00 | 1.54 | 0.43 | 16.91 | 20.43 | 27.34 |
| 2.16 | 27.65 | 10.11 | 1.40 | 0.02 | 30.18 | 29.50 | 2.82 | 1.41 | 0.42 | 15.68 | 20.26 | 27.57 |

REZULTATE RANDAMENTE, PUTERI LA ARBORE

\*\*\*\*\*

| r[m] | cyinf | cyANV | cxinf | cxANV | RANDA | Dpc   | DelQ  | DelPt | DelParb |
|------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| 2.16 | 1.40  | 0.92  | 0.02  | 0.18  | 0.66  | 47.83 | 19.93 | 0.95  | 0.63    |
| 1.98 | 1.41  | 0.93  | 0.02  | 0.18  | 0.66  | 47.77 | 18.27 | 0.87  | 0.57    |
| 1.80 | 1.43  | 0.94  | 0.02  | 0.18  | 0.66  | 47.22 | 16.61 | 0.78  | 0.51    |
| 1.62 | 1.44  | 0.94  | 0.02  | 0.19  | 0.66  | 46.12 | 14.95 | 0.69  | 0.45    |
| 1.44 | 1.44  | 0.95  | 0.02  | 0.19  | 0.66  | 44.34 | 13.29 | 0.59  | 0.39    |
| 1.26 | 1.43  | 0.94  | 0.02  | 0.18  | 0.66  | 41.71 | 11.63 | 0.49  | 0.32    |
| 1.08 | 1.38  | 0.91  | 0.02  | 0.17  | 0.66  | 37.90 | 9.97  | 0.38  | 0.25    |
| 0.90 | 1.27  | 0.83  | 0.01  | 0.15  | 0.66  | 32.27 | 8.31  | 0.27  | 0.18    |
| 0.72 | 1.02  | 0.67  | 0.01  | 0.10  | 0.65  | 23.43 | 6.64  | 0.16  | 0.10    |
| 0.54 | 0.41  | 0.27  | 0.01  | 0.02  | 0.65  | 8.32  | 4.98  | 0.04  | 0.03    |

DATE INSUMATE

Pt[kW]= 5.217526      Parb[kW]= 3.420909      RANDA = .6556573

**Rezultatele din fișierul RVER14 Varianta D**

program RVER.BAS

FISIER REZULTATE:RVER14

CODUL TURBINEI Marga

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307      GR= .75

Datele geometrice ale variantei de turbina tehnologizata

|           |             |                   |       |        |       |
|-----------|-------------|-------------------|-------|--------|-------|
| lc=a-b*r; | dr=a1-b1*r; | betinstgr=a2/r-b2 |       |        |       |
| a         | b           | a1                | b1    | a2     | b2    |
| 0.550     | 0.111       | 0.300             | 0.080 | 25.000 | 6.000 |

MARIMI GEOMETRICE PENTRU PALETE

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| r[m]  | lc[m] | dr=d/lc[-] | betinstgr |
|-------|-------|------------|-----------|
| 0.540 | 0.490 | 0.257      | 40.296    |
| 0.720 | 0.470 | 0.242      | 28.722    |
| 0.900 | 0.450 | 0.228      | 21.778    |
| 1.080 | 0.430 | 0.214      | 17.148    |
| 1.260 | 0.410 | 0.199      | 13.841    |
| 1.440 | 0.390 | 0.185      | 11.361    |
| 1.620 | 0.370 | 0.170      | 9.432     |
| 1.800 | 0.350 | 0.156      | 7.889     |
| 1.980 | 0.330 | 0.142      | 6.626     |
| 2.160 | 0.310 | 0.127      | 5.574     |

\*\*\*\*\*

ANV= 4.049848      z= 4      Soliditate: .9431749

\*\*\*\*\*

| r    | u     | inc   | cyinf | cxinf | winf  | winf_c | vt   | vtc  | Grc   | betinf | Delpsc | Delpdc |
|------|-------|-------|-------|-------|-------|--------|------|------|-------|--------|--------|--------|
| 0.54 | 6.91  | 0.12  | 0.41  | 0.01  | 12.59 | 11.13  | 5.34 | 1.32 | -1.47 | 40.41  | -16.51 | 27.72  |
| 0.72 | 9.22  | 6.22  | 1.02  | 0.01  | 14.25 | 13.40  | 4.93 | 2.83 | 0.25  | 34.94  | 8.07   | 23.88  |
| 0.90 | 11.52 | 8.82  | 1.27  | 0.01  | 16.03 | 15.42  | 4.56 | 3.12 | 0.48  | 30.60  | 21.20  | 22.83  |
| 1.08 | 13.82 | 9.97  | 1.38  | 0.02  | 17.90 | 17.38  | 4.22 | 3.05 | 0.55  | 27.12  | 28.49  | 23.10  |
| 1.26 | 16.13 | 10.44 | 1.43  | 0.02  | 19.84 | 19.36  | 3.92 | 2.87 | 0.58  | 24.28  | 32.86  | 23.76  |
| 1.44 | 18.43 | 10.58 | 1.44  | 0.02  | 21.84 | 21.38  | 3.65 | 2.66 | 0.59  | 21.94  | 35.56  | 24.46  |

```

1.62 20.74 10.55 1.44 0.02 23.88 23.43 3.41 2.45 0.60 19.98 37.17 25.11
1.80 23.04 10.44 1.43 0.02 25.95 25.51 3.19 2.26 0.60 18.33 37.98 25.67
1.98 25.34 10.28 1.41 0.02 28.06 27.61 3.00 2.07 0.59 16.91 38.13 26.16
2.16 27.65 10.11 1.40 0.02 30.18 29.74 2.82 1.90 0.59 15.68 37.70 26.58

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REZULTATE RANDAMENTE, PUTERI LA ARBORE

\*\*\*\*\*

| r[m] | cyinf | cyANV | cxinf | cxANV | RANDA | Dpc   | DelQ  | DelPt | DelParb |
|------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| 2.16 | 1.40  | 0.92  | 0.02  | 0.18  | 0.66  | 64.28 | 19.93 | 1.28  | 0.84    |
| 1.98 | 1.41  | 0.93  | 0.02  | 0.18  | 0.66  | 64.29 | 18.27 | 1.17  | 0.77    |
| 1.80 | 1.43  | 0.94  | 0.02  | 0.18  | 0.66  | 63.65 | 16.61 | 1.06  | 0.69    |
| 1.62 | 1.44  | 0.94  | 0.02  | 0.19  | 0.66  | 62.28 | 14.95 | 0.93  | 0.61    |
| 1.44 | 1.44  | 0.95  | 0.02  | 0.19  | 0.66  | 60.02 | 13.29 | 0.80  | 0.52    |
| 1.26 | 1.43  | 0.94  | 0.02  | 0.18  | 0.66  | 56.61 | 11.63 | 0.66  | 0.43    |
| 1.08 | 1.38  | 0.91  | 0.02  | 0.17  | 0.66  | 51.59 | 9.97  | 0.51  | 0.34    |
| 0.90 | 1.27  | 0.83  | 0.01  | 0.15  | 0.66  | 44.03 | 8.31  | 0.37  | 0.24    |
| 0.72 | 1.02  | 0.67  | 0.01  | 0.10  | 0.65  | 31.95 | 6.64  | 0.21  | 0.14    |
| 0.54 | 0.41  | 0.27  | 0.01  | 0.02  | 0.65  | 11.20 | 4.98  | 0.06  | 0.04    |

DATE INSUMATE

Pt[kW]= 7.048557      Parb[kW]= 4.621435      RANDA = .6556569

**Rezultatele din fișierul RVER15 Varianta D**

program RVER.BAS

FISIER REZULTATE:RVER15

CODUL TURBINEI Marga

REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE

D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]= 8.618307      GR= .75

-----  
Datele geometrice ale variantei de turbina tehnologizata

lc=a-b\*r;      dr=a1-b1\*r;      betinstgr=a2/r-b2  
a      b      a1      b1      a2      b2  
0.550      0.111      0.300      0.080      25.000      6.000

MARIMI GEOMETRICE PENTRU PALETE

\*\*\*\*\*

| r[m]  | lc[m] | dr=d/lc[-] | betinstgr |
|-------|-------|------------|-----------|
| 0.540 | 0.490 | 0.257      | 40.296    |
| 0.720 | 0.470 | 0.242      | 28.722    |
| 0.900 | 0.450 | 0.228      | 21.778    |
| 1.080 | 0.430 | 0.214      | 17.148    |
| 1.260 | 0.410 | 0.199      | 13.841    |
| 1.440 | 0.390 | 0.185      | 11.361    |
| 1.620 | 0.370 | 0.170      | 9.432     |
| 1.800 | 0.350 | 0.156      | 7.889     |
| 1.980 | 0.330 | 0.142      | 6.626     |
| 2.160 | 0.310 | 0.127      | 5.574     |

\*\*\*\*\*

ANV= 4.049848      z= 5      Soliditate: 1.178969

\*\*\*\*\*

| r    | u     | inc   | cyinf | cxinf | winf  | winc  | vt   | vtc  | Grc   | betinf | Delpsc | Delpdc |
|------|-------|-------|-------|-------|-------|-------|------|------|-------|--------|--------|--------|
| 0.54 | 6.91  | 0.12  | 0.41  | 0.01  | 12.59 | 11.25 | 5.34 | 1.67 | -0.91 | 40.41  | -12.92 | 27.08  |
| 0.72 | 9.22  | 6.22  | 1.02  | 0.01  | 14.25 | 13.72 | 4.93 | 3.62 | 0.49  | 34.94  | 20.12  | 20.76  |
| 0.90 | 11.52 | 8.82  | 1.27  | 0.01  | 16.03 | 15.79 | 4.56 | 3.99 | 0.66  | 30.60  | 37.35  | 19.02  |
| 1.08 | 13.82 | 9.97  | 1.38  | 0.02  | 17.90 | 17.76 | 4.22 | 3.89 | 0.70  | 27.12  | 46.36  | 19.52  |
| 1.26 | 16.13 | 10.44 | 1.43  | 0.02  | 19.84 | 19.72 | 3.92 | 3.65 | 0.71  | 24.28  | 51.43  | 20.64  |
| 1.44 | 18.43 | 10.58 | 1.44  | 0.02  | 21.84 | 21.71 | 3.65 | 3.37 | 0.71  | 21.94  | 54.37  | 21.81  |
| 1.62 | 20.74 | 10.55 | 1.44  | 0.02  | 23.88 | 23.74 | 3.41 | 3.10 | 0.71  | 19.98  | 55.98  | 22.88  |

```

1.80 23.04 10.44  1.43  0.02 25.95 25.79  3.19  2.85  0.70 18.33  56.63 23.81
1.98 25.34 10.28  1.41  0.02 28.06 27.87  3.00  2.61  0.70 16.91  56.51 24.61
2.16 27.65 10.11  1.40  0.02 30.18 29.98  2.82  2.39  0.69 15.68  55.70 25.29
*****
REZULTATE RANDAMENTE, PUTERI LA ARBORE
*****
r[m]      cyinf  cyANV  cxinf  cxANV  RANDA  Dpc    DelQ    DelPt  DelParb
*****
2.16      1.40    0.92   0.02   0.18   0.66   80.99  19.93   1.61   1.06
1.98      1.41    0.93   0.02   0.18   0.66   81.11  18.27   1.48   0.97
1.80      1.43    0.94   0.02   0.18   0.66   80.45  16.61   1.34   0.88
1.62      1.44    0.94   0.02   0.19   0.66   78.87  14.95   1.18   0.77
1.44      1.44    0.95   0.02   0.19   0.66   76.19  13.29   1.01   0.66
1.26      1.43    0.94   0.02   0.18   0.66   72.07  11.63   0.84   0.55
1.08      1.38    0.91   0.02   0.17   0.66   65.88   9.97   0.66   0.43
0.90      1.27    0.83   0.01   0.15   0.66   56.36   8.31   0.47   0.31
0.72      1.02    0.67   0.01   0.10   0.65   40.88   6.64   0.27   0.18
0.54      0.41    0.27   0.01   0.02   0.65   14.15   4.98   0.07   0.05
DATE INSUMATE
Pt[kW]= 8.929494      Parb[kW]= 5.854678      RANDA = .6556562

```

**Rezultatele din fișierul RVER16 Varianta D**

```

program RVER.BAS
FISIER REZULTATE:RVER16
CODUL TURBINEI Marga
REZULTATELE CALCULELOR (coeficienti) PENTRU URMATOARELE DATE
D[m]= 4.5 ;uR[m/s]= 28.8 ;v1[m/s]= 9.6 ;RO[kg/m3]= 1.225 ;kv3a= .7 ;PC[kW]=
8.618307 GR= .75

```

Datele geometrice ale variantei de turbina tehnologizata

```

lc=a-b*r;      dr=a1-b1*r;      betinstgr=a2/r-b2
a      b      a1      b1      a2      b2
0.550  0.111  0.300  0.080  25.000  6.000

```

MARIMI GEOMETRICE PENTRU PALETE

```

*****
r[m]      lc[m]      dr=d/lc[-]  betinstgr
*****
0.540      0.490      0.257      40.296
0.720      0.470      0.242      28.722
0.900      0.450      0.228      21.778
1.080      0.430      0.214      17.148
1.260      0.410      0.199      13.841
1.440      0.390      0.185      11.361
1.620      0.370      0.170      9.432
1.800      0.350      0.156      7.889
1.980      0.330      0.142      6.626
2.160      0.310      0.127      5.574

```

```

*****
ANV= 4.049848      z= 6      Soliditate: 1.414762
*****

```

```

r  u  inc  cyinf  cxinf  winf  winfc  vt  vtc  Grc  betinf  Delpsc  Delpdc
*****
0.54  6.91  0.12  0.41  0.01 12.59 11.38  5.34  2.03 -0.53 40.41 -9.10 26.27
0.72  9.22  6.22  1.02  0.01 14.25 14.05  4.93  4.45  0.67 34.94 33.60 16.65
0.90 11.52  8.82  1.27  0.01 16.03 16.18  4.56  4.91  0.80 30.60 55.32 14.01
1.08 13.82  9.97  1.38  0.02 17.90 18.15  4.22  4.77  0.82 27.12 65.96 14.84
1.26 16.13 10.44  1.43  0.02 19.84 20.09  3.92  4.46  0.81 24.28 71.50 16.61
1.44 18.43 10.58  1.44  0.02 21.84 22.05  3.65  4.11  0.80 21.94 74.44 18.43
1.62 20.74 10.55  1.44  0.02 23.88 24.05  3.41  3.78  0.79 19.98 75.84 20.06
1.80 23.04 10.44  1.43  0.02 25.95 26.08  3.19  3.46  0.78 18.33 76.15 21.46

```

```

1.98 25.34 10.28 1.41 0.02 28.06 28.14 3.00 3.16 0.77 16.91 75.61 22.65
2.16 27.65 10.11 1.40 0.02 30.18 30.22 2.82 2.89 0.76 15.68 74.30 23.66
*****
REZULTATE RANDAMENTE, PUTERI LA ARBORE
*****
r[m]      cyinf  cyANV  cxinf  cxANV  RANDA  Dpc  DelQ  DelPt  DelParb
*****
2.16     1.40   0.92   0.02   0.18   0.66   97.97 19.93  1.95   1.28
1.98     1.41   0.93   0.02   0.18   0.66   98.26 18.27  1.80   1.18
1.80     1.43   0.94   0.02   0.18   0.66   97.62 16.61  1.62   1.06
1.62     1.44   0.94   0.02   0.19   0.66   95.90 14.95  1.43   0.94
1.44     1.44   0.95   0.02   0.19   0.66   92.87 13.29  1.23   0.81
1.26     1.43   0.94   0.02   0.18   0.66   88.10 11.63  1.02   0.67
1.08     1.38   0.91   0.02   0.17   0.66   80.80  9.97   0.81   0.53
0.90     1.27   0.83   0.01   0.15   0.66   69.33  8.31   0.58   0.38
0.72     1.02   0.67   0.01   0.10   0.65   50.25  6.64   0.33   0.22
0.54     0.41   0.27   0.01   0.02   0.65   17.17  4.98   0.09   0.06
DATE INSUMATE
Pt[kW]= 10.86302      Parb[kW]= 7.122399      RANDA = .6556557

```

### 3.6.4. Sinteza dimensiunilor

#### SINTEZA DIMENSIUNILOR COMPLETE EXTERIOARE

| Nr. crt. | R [m] | l [mm]                                 | dmax [mm] | d/l   | betainst [gr] | Codul profilului |
|----------|-------|--|-----------|-------|---------------|------------------|
| 1        | 0,06  | Fus cu sectiune dreptunghiulara 70/100 |           |       |               |                  |
| 2        | 0,20  | Fus cu sectiune dreptunghiulara 70/80  |           |       |               |                  |
| 3        | 0,30  | 140                                    | 82        | 0,586 | 6             | NACA14.586       |
| 4        | 0,40  | 220                                    | 89        | 0,406 | 12            | NACA24.406       |
| 5        | 0,50  | 310                                    | 93        | 0,300 | 17            | NACA34.300       |
| 6        | 0,60  | 380                                    | 100       | 0,263 | 23            | NACA44.263       |
| 7        | 0,80  | 361                                    | 85,2      | 0,236 | 16,75         | NACA44.236       |
| 8        | 1,00  | 339                                    | 74,6      | 0,220 | 13,00         | NACA44.220       |
| 9        | 1,20  | 317                                    | 64,7      | 0,204 | 10,50         | NACA44.204       |
| 10       | 1,40  | 294                                    | 55,3      | 0,188 | 8,71          | NACA44.188       |
| 11       | 1,60  | 272                                    | 46,8      | 0,172 | 7,38          | NACA44.172       |
| 12       | 1,80  | 250                                    | 36,0      | 0,144 | 6,33          | NACA44.144       |
| 13       | 2,00  | 228                                    | 31,9      | 0,140 | 5,50          | NACA44.140       |
| 14       | 2,20  | 205                                    | 25,4      | 0,124 | 4,80          | NACA44.124       |
| 15       | 2,35A | 168                                    | 14        | 0,08  | 0             | NACA00.08        |
| 16       | 2,35B | 150                                    | 12,6      | 0,08  | 0             | NACA00.08        |
| 17       | 2,35C | 130                                    | 11,3      | 0,08  | 0             | NACA00.08        |
| 18       | 2,35D | 116                                    | 10        | 0,08  | 0             | NACA00.08        |

Au fost completate față de faza anterioară cu cele două capete ale paletii (racordul de susținere și structura de capăt)

#### SINTEZA DIMENSIUNILOR COMPLETE INTERIOARE

| Nr. crt. | R [m] | l[mm] | dmax[mm] | d/l   | betainst[gr] | Codul profilului |
|----------|-------|-------|----------|-------|--------------|------------------|
| 1        | 0,30  | 126,8 | 75       | 0,591 | 6            | NACA14.591       |

|    |      |       |      |       |       |            |
|----|------|-------|------|-------|-------|------------|
| 2  | 0,40 | 205,4 | 82   | 0,399 | 12    | NACA24.399 |
| 3  | 0,50 | 294   | 88   | 0,299 | 17    | NACA34.299 |
| 4  | 0,60 | 362   | 90   | 0,249 | 23    | NACA44.900 |
| 5  | 0,80 | 340,8 | 75,2 | 0,221 | 16,75 | NACA44.752 |
| 6  | 1,00 | 316   | 64,6 | 0,204 | 13    | NACA44.646 |
| 7  | 1,2  | 291,2 | 54,7 | 0,188 | 10,5  | NACA44.547 |
| 8  | 1,4  | 265,4 | 45,3 | 0,171 | 8,71  | NACA44.453 |
| 9  | 1,6  | 240,6 | 36,8 | 0,153 | 7,38  | NACA44.368 |
| 10 | 1,8  | 215,8 | 26   | 0,120 | 6,33  | NACA44.260 |
| 11 | 2,0  | 192   | 21,9 | 0,115 | 5,50  | NACA44.219 |
| 12 | 2,2  | 165,2 | 15,4 | 0,093 | 4,80  | NACA44.154 |

### 3.7. Programul STPALR

#### 3.7.1. Programul STPALR.BAS

```

REM programul "STATPAL.BAS" statica paletii este pentru calculul de rezistenta
a paletii intocmita pentru paleta turbinei pentru firma CLAGI
REM prgramul este elaborat pentru doua variante, prima trateaza paleta ca o
singura grinda supusa la tractiune si incovoiere, a doua divizeaza grinda in
mai multe tronsoane pentru a pune in evidenta distributia incarcarilor
dealungul corzii
REM o parte din date sunt preluate din programul "RVAR.BAS" cu rezultate
afisate in RVER9 si RVER10
REM DATELE PENTRU MODULUL DE REZISTENTA sunt luate din cartea lui Zidaru
REM VARIANTA 1 "O SINGURA GRINDA"
REM Numarul de ordine "i" este folosit pentru sectiunile paletii la diferite
raze
REM Notatii utilizate (explicatii nu sunt necesare decat la unele ()):
REM R(curent), Rext,Rint,s,ro(densitatea
aerului),ropafs(structura),n,omega,v,l,dm,li,dmi,Ss,
REM Jxs,Jys,Wxs,Wys,BETINF,WINF,INC,Fy,Fx,Fyc,Fxc,SUMCF,SUMMIY,SUMMIX,
REM SIGMTR,SIGMINCX,SIGMINCY,u,Parb,Marb,CP,Delr,Rconstr,Rintc,BETINST,
REM S-au afisat notatiile pentru a ajuta eventuale depanari
REM Delfyc,Delfxc c==coarda
REM DELFax,DELftg
REM Varianta la primul program cu relatii aproximative pentru winfc si batainf
CLS
Rext = 2.16
Rint = .54
INPUT "numar de palete z="; z
imax = 10
INPUT "grosime strat PAFS[mm]="; s
INPUT "viteza periferica la rext uR="; uR
PI = 3.1415
INPUT "viteza vantului amonte v[m/s]="; vAM
LET v = .85 * vAM
LAMB0 = uR / vAM
omega = uR / Rext: n = omega * 30 / PI
PRINT "imax="; imax
REM DECLARATII DE TABLOURI DE DATE:
DIM r(imax)
DIM cyanv(imax), cxanv(imax)
DIM delr(i)

```

```
DIM inc(imax)
DIM lint(imax)
DIM drint(imax)
DIM Delint(imax)
DIM lc(imax), dr(imax), Ss(imax), Jxs(imax), Jys(imax), Wxs(imax), Wys(imax)
DIM l(imax)
DIM Delmas(imax)
DIM winfc(imax)
DIM DelFCF(imax)
DIM winf(imax), betinf(imax), betinst(imax)
DIM DelFy(imax), DelFx(imax), DelFyc(imax), DelFxc(imax)
DIM FCF(imax)
DIM Miyc(imax)
DIM Mixc(imax)
DIM SumFCF(imax), SUMMIY(imax), SUMMIX(imax)
DIM SIGMATR(imax), SIGMAIX(imax), SIGMAIY(imax)
DIM DelFax(imax), DelFtg(imax)
REM Atentie la unitati de masura dim.prof [mm],Ss,J,W [cm],unghiuri[gr]
PRINT " a a1 a2 b b1 b2 Rconstr Rintc ro roPAFS'"
READ a, a1, a2, b, b1, b2, Rconstr, Rintc, RO, ROPAFS
PRINT a; a1; a2; b; b1; b2; Rconstr; Rintc; RO; ROPAFS
DATA .45,.3,15,.111,.08,2,2.25,.45,1.225,1.85
REM Rext = 2.16: PRINT "Rext="; Rext
REM Rint = .54: PRINT "Rint="; Rint
REM PRINT "RAZELE DE CALCUL [m]:"
FOR i = 1 TO imax
READ r(i)
REM PRINT r(i);
NEXT i
DATA 2.16,1.98,1.8,1.62,1.44,1.26,1.08,.9,.72,.54
PRINT ''
FOR i = 1 TO imax
u(i) = omega * r(i)
NEXT i
REM PRINT "Coeficienti de portanta la anvergura finita"
FOR i = 1 TO imax
READ cyanv(i)
REM PRINT cyanv(i);
NEXT i
DATA 1.05,1.09,1.13,1.18,1.24,1.3,1.36,1.41,1.42,1.32
REM PRINT "Coeficienti de rezistenta la anvergura finita"
FOR i = 1 TO imax
READ cxanv(i)
REM PRINT cxanv(i);
NEXT i
DATA .15,.16,.17,.19,.21,.23,.25,.26,.27,.23
REM PRINT "unghi cinematic beta infinit [gr]"
FOR i = 1 TO imax
REM READ betinf(i)
REM PRINT betinf(i);
betinf(i) = (ATN(v / (u(i) + 2))) * 180 / PI
NEXT i
REM DATA 15.68,16.91,18.33,19.98,21.94,24.28,27.12,30.6,34.94,40.41
REM PRINT "Viteza relativa infinita la anv finita [m/s]"
FOR i = 1 TO imax
winfc(i) = SQR((u(i) + 2) ^ 2 + v ^ 2)
REM READ winfc(i)
REM PRINT winfc(i);
NEXT i
REM DATA 29.3,27.17,25.06,22.99,20.96,18.98,17.08,15.27,13.58,12.01
delr = (r(1) - r(imax)) / (imax - 1)
```



```

PRINT "Delr[m]="; delr
FOR i = 1 TO imax
r(i) = Rext - (i - 1) * delr
NEXT i
FOR i = 1 TO imax
lc(i) = a - b * r(i): dr(i) = a1 - b1 * r(i): betinst(i) = a2 / r(i) - b2
lint(i) = 1000 * lc(i) - (s + .2 * s ^ 2 - 1 + 2.8 * s * r(i))
Delint(i) = s + .2 * s ^ 2 - 1 + 2.8 * s * r(i)
REM atentie s[mm] si r[m]
drint(i) = (dr(i) * 1000 * lc(i) - 2 * s) / lint(i)
inc(i) = betinf(i) - betinst(i)
NEXT i
PRINT " Afisarea rezultatelor in fisierul STPALRj"
INPUT "enter filename"; n$
OPEN n$ FOR OUTPUT AS #1
PRINT #1, "REZULTATE ALE CALCULELOR STATICE PENTRU TURBINA MARGA"
PRINT #1, "PROGRAM STPALR.BAS      REZULTATE "; n$
PRINT #1, "uR[m/s]="; uR; "vAM[m/s+"; vAM; "v[m/s]="; v; "LAMB0="; LAMB0;
"RO[kg/m^3]="; RO; "ROPAFS[kg/dm^3]="; ROPAFS
PRINT #1, "Grosimea stratului din PAFS s[mm]="; s; "nr.palete="; z
PRINT #1, "  R[m]  lc[mm]  dr[-]  betinst betinf INC[gr] Delint[mm] lint[mm]
drint[-] "
FOR i = 1 TO imax
PRINT #1, USING "###.### "; r(i); 1000 * lc(i); dr(i); betinst(i); betinf(i);
inc(i); Delint(i); lint(i); drint(i)
NEXT i
PRINT "Atentie unghiurile in grade sex"
REM calcule pentru arii, momente de inertie si module de rezistenta
REM PRINT "ARIILE SECTIUNILOR DE CALCUL [cm^2]"
FOR i = 1 TO imax
Sext = .685084 * dr(i) * (100 * lc(i)) ^ 2: Sint = .685084 * drint(i) *
(lint(i) / 10) ^ 2
Ss(i) = Sext - Sint
REM PRINT USING "###.## "; Ss(i);
NEXT i
REM PRINT "MOMENTE DE INERTIE [cm^4]"
fr = .04
FOR i = 1 TO imax
Jxext = (.0394072 * dr(i) ^ 3 + .446784 * dr(i) * fr ^ 2) * (lc(i) * 100) ^ 4
Jyext = .0421516 * dr(i) * (100 * lc(i)) ^ 4
Jxint = (.0394072 * drint(i) ^ 3 + .446784 * drint(i) * fr ^ 2) * (lint(i) /
10) ^ 4
Jyint = .0421516 * drint(i) * (lint(i) / 10) ^ 4
Jxs(i) = Jxext - Jxint: Jys(i) = Jyext - Jyint
REM PRINT Jxs(i); Jys(i);
NEXT i
PRINT '''
REM PRINT "MODULE DE REZISTENTA [cm^3]"
FOR i = 1 TO imax
Wxs(i) = Jxs(i) / (dr(i) * lc(i) * 100 / 2): Wys(i) = Jys(i) / (lc(i) * 50)
REM PRINT Wxs(i); Wys(i);
NEXT i
REM sinteza caracteristici geometrice pentru rezistenta
PRINT #1, "SINTEZE ALE CARACTERISTICILOR GEOMETRICE"
PRINT #1, "  r(i)  u(i)      Ss(i)      Jxs(i)      Wxs(i)      Jys(i)      Wys(i)
Delmas(i) "
PRINT #1, " [m]  m/s      [cm^2]      [cm^4]      [cm^3]      [cm^4]      [cm^3]      [kg]"
Summas = 0
FOR i = 1 TO imax
Delmas(i) = ROPAFS * Ss(i) / 100 * delr * 10
Summas = Summas + Delmas(i)

```

```

NEXT i
FOR i = 1 TO imax
PRINT #1, USING "####.## "; r(i); u(i); Ss(i); Jxs(i); Wxs(i); Jys(i); Wys(i);
Delmas(i)
NEXT i
PRINT #1, "Masa totala a paletii [kg]"; Summas
REM mase elementare [kg] si forte centrifuge
SumFCF = 0
FOR i = 1 TO imax
DelFCF(i) = Delmas(i) * r(i) * omega ^ 2
SumFCF = SumFCF + DelFCF(i)
NEXT i
REM Forte aerodinamice DelFy si DelFx
FOR i = 1 TO imax
DelFy(i) = cyanv(i) * RO * winfc(i) ^ 2 / 2 * lc(i) * delr
DelFx(i) = cxanv(i) * RO * winfc(i) ^ 2 / 2 * lc(i) * delr
NEXT i
REM forte recalculate pentru coordonate ale corzii si directii
axial/tangentiale
FOR i = 1 TO imax
DelFyc(i) = DelFy(i) * COS(inc(i) * PI / 180) + DelFx(i) * SIN(inc(i) * PI /
180)
DelFxc(i) = -DelFy(i) * SIN(inc(i) * PI / 180) + DelFx(i) * COS(inc(i) * PI /
180)
DelFax(i) = DelFy(i) * COS(betinf(i) * PI / 180) + DelFx(i) * SIN(betinf(i) *
PI / 180)
DelFtg(i) = DelFy(i) * SIN(betinf(i) * PI / 180) - DelFx(i) * COS(betinf(i) *
PI / 180)
NEXT i
REM forte si momente incovoietoare reduce
DIM Miax(imax)
DIM Mitg(imax)
DIM MT(imax)
DIM PT(imax)
sumFax = 0
FOR i = 1 TO imax
sumFax = sumFax + DelFax(i)
NEXT i
sumFtg = 0
FOR i = 1 TO imax
sumFtg = sumFtg + DelFtg(i)
NEXT i
FOR j = 1 TO imax
sumMiax = 0: sumMitg = 0: SumFCF = 0
FOR i = 1 TO imax
SumFCF = SumFCF + DelFCF(i)
sumMiax = sumMiax + DelFax(i) * (r(i) - r(j))
sumMitg = sumMitg + DelFtg(i) * (r(i) - r(j))
IF i = j THEN GOTO 100
NEXT i
100 Miax(j) = sumMiax: Mitg(j) = sumMitg: FCF(i) = SumFCF
NEXT j
sumMT = 0
FOR i = 1 TO imax
MT(i) = DelFtg(i) * r(i)
sumMT = sumMT + MT(i)
NEXT i
totMT = sumMT
SumPT = 0
FOR i = 1 TO imax
PT(i) = MT(i) * omega

```

```

SumPT = SumPT + PT(i)
NEXT i
totPT = SumPT
REM afisaje pentru forte
PRINT #1, "AFISAJE PENTRU FORTE"
PRINT
"
PRINT #1, "R      FCF      Fy      Fx      Fyc      Fxc      Fax      Ftg      Miax      Mitg      MT
PT"
PRINT #1, "[m]    [N]     [N]     [N]     [N]     [N]     [N]     [N]     [Nm]    [Nm]    [Nm]
[W] "
PRINT
"
FOR i = 1 TO imax
PRINT #1, USING "###.# "; r(i); DelFCF(i); DelFy(i); DelFx(i); DelFyc(i);
DelFxc(i); DelFax(i); DelFtg(i); Miax(i); Mitg(i); MT(i); PT(i)
NEXT i
PRINT #1, "SumFCF[N]="; SumFCF; "sumMT[Nm]="; totMT; "sumPT[W]="; totPT
PRINT #1, "Puterea la arbore pentru turbina cu z palete[kW]="; z * totPT / 1000
REM Momente incovoietoare reduse pentru coordonatele coarda si perpendiculara
pe coarda
FOR i = 1 TO imax
Miy(i) = Miax(i) * COS(betinst(i) * PI / 180) - Mitg(i) * SIN(betinst * PI /
180)
Mix(i) = Miax(i) * SIN(betinst(i) * PI / 180) + Mitg(i) * COS(betinst(i) * PI
/ 180)
NEXT i
REM CALCULUL EFORTURILOR unitati [daN/cm^2]
FOR i = 1 TO imax
SIGMATR(i) = FCF(i) / 10 / Ss(i)
SIGMAIY(i) = Miy(i) * 10 / Wxs(i)
SIGMAIX(i) = Mix(i) * 10 / Wys(i)
NEXT i
REM AFISAREA EFORTURILOR
PRINT #1, "INCARCARI SI EFORTURI"
PRINT
"
"
PRINT #1, "      r      FCF      Miy      Mix      Sigmatr      Sigmaiy      Sigmaix"
PRINT #1, "[m]    [daN]    [daNcm] [daNcm] [daN/cm^2] [daN/cm^2] [daN/cm^2]"
PRINT
"
FOR i = 1 TO imax
PRINT #1, USING "#.### ##### #####      #####      #####      #####";
r(i); FCF(i) / 10; Miy(i) * 10; Mix(i) * 10; SIGMATR(i); SIGMAIY(i);
SIGMAIX(i)
NEXT i
PRINT #1, "Evaluari ale solicitarilor la incastrare"
MiAXB = MiAX(10) + sumFax * (r(10) - .2)
Mitgb = Mitg(10) + sumFtg * (r(10) - .2)
FCFb = SumFCF + 200
REM unitati N,Nm
PRINT #1, "MiAXB[Nm]="; MiAXB; " Mitgb[Nm]="; Mitgb; " FCFb[N]="; FCFb
CLOSE
END

```

### 3.7.2. Cazurile analizate

| Nr. | Numele | $u_R$ | $V_{AM}$ | S | Z |
|-----|--------|-------|----------|---|---|
|-----|--------|-------|----------|---|---|

| crt. | fișierului | [m/s] | [m/s] | [mm] | [-] |
|------|------------|-------|-------|------|-----|
| 1    | STPALR441  | 28,8  | 11,7  | 3    | 4   |
| 2    | STPALR451  | 28,8  | 11,7  | 3    | 5   |
| 3    | STPALR461  | 28,8  | 11,7  | 3    | 6   |
| 4    | STPALR331  | 28,8  | 9,6   | 3    | 3   |
| 5    | STPALR332  | 38,4  | 9,6   | 3    | 3   |
| 6    | STPALR333  | 48    | 9,6   | 3    | 3   |
| 7    | STPALR511  | 28,8  | 9,6   | 5    | 3   |
| 8    | STPALR512  | 38,4  | 9,6   | 5    | 3   |
| 9    | STPALR513  | 48    | 9,6   | 5    | 3   |
| 10   | STPALR522  | 28,8  | 11,7  | 5    | 3   |
| 11   | STPALR521  | 38,4  | 11,7  | 5    | 3   |
| 12   | STPALR523  | 48    | 11,7  | 5    | 3   |

### 3.7.3. Rezultatele programului STPALR.BAS

#### Rezultatele din fișierul STPALR441

REZULTATE ALE CALCULELOR STATICE PENTRU TURBINA MARGA  
PROGRAM STPALR.BAS REZULTATE STPALR441

$uR[m/s]= 28.8$   $vAM[m/s]= 11.7$   $v[m/s]= 9.945$   $LAMB0= 2.461539$   $RO[kg/m^3]= 1.225$   
 $ROPAFS[kg/dm^3]= 1.85$

Grosimea stratului din PAFS  $s[mm]= 3$  nr.palete= 4

| R[m]  | lc[mm]  | dr[-] | betinst | betinf | INC[gr] | Delint[mm] | lint[mm] | drint[-] |
|-------|---------|-------|---------|--------|---------|------------|----------|----------|
| 2.160 | 210.240 | 0.127 | 4.944   | 17.895 | 12.951  | 21.944     | 188.296  | 0.110    |
| 1.980 | 230.220 | 0.142 | 5.576   | 19.300 | 13.724  | 20.432     | 209.788  | 0.127    |
| 1.800 | 250.200 | 0.156 | 6.333   | 20.932 | 14.599  | 18.920     | 231.280  | 0.143    |
| 1.620 | 270.180 | 0.170 | 7.259   | 22.851 | 15.592  | 17.408     | 252.772  | 0.158    |
| 1.440 | 290.160 | 0.185 | 8.417   | 25.132 | 16.716  | 15.896     | 274.264  | 0.174    |
| 1.260 | 310.140 | 0.199 | 9.905   | 27.879 | 17.974  | 14.384     | 295.756  | 0.189    |
| 1.080 | 330.120 | 0.214 | 11.889  | 31.234 | 19.345  | 12.872     | 317.248  | 0.203    |
| 0.900 | 350.100 | 0.228 | 14.667  | 35.389 | 20.723  | 11.360     | 338.740  | 0.218    |
| 0.720 | 370.080 | 0.242 | 18.833  | 40.609 | 21.775  | 9.848      | 360.232  | 0.232    |
| 0.540 | 390.060 | 0.257 | 25.778  | 47.230 | 21.452  | 8.336      | 381.724  | 0.247    |

#### SINTEZE ALE CARACTERISTICILOR GEOMETRICE

| r(i) | u(i)  | Ss(i)              | Jxs(i)             | Wxs(i)             | Jys(i)             | Wys(i)             | Delmas(i) |
|------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|-----------|
| [m]  | [m/s] | [cm <sup>2</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [kg]      |
| 2.16 | 28.80 | 11.76              | 17.09              | 12.78              | 463.81             | 44.12              | 0.39      |
| 1.98 | 26.40 | 13.19              | 26.75              | 16.41              | 641.48             | 55.73              | 0.44      |
| 1.80 | 24.00 | 14.57              | 40.27              | 20.63              | 854.37             | 68.29              | 0.49      |
| 1.62 | 21.60 | 15.88              | 58.64              | 25.48              | 1101.62            | 81.55              | 0.53      |
| 1.44 | 19.20 | 17.11              | 82.98              | 30.95              | 1380.44            | 95.15              | 0.57      |
| 1.26 | 16.80 | 18.24              | 114.50             | 37.07              | 1685.81            | 108.71             | 0.61      |
| 1.08 | 14.40 | 19.26              | 154.52             | 43.83              | 2010.23            | 121.79             | 0.64      |
| 0.90 | 12.00 | 20.14              | 204.39             | 51.21              | 2343.39            | 133.87             | 0.67      |
| 0.72 | 9.60  | 20.86              | 265.51             | 59.20              | 2671.94            | 144.40             | 0.69      |
| 0.54 | 7.20  | 21.41              | 339.27             | 67.74              | 2979.16            | 152.75             | 0.71      |

Masa totala a paletii [kg] 5.741491

AFISAJE PENTRU FORTE

| R   | FCF   | Fy   | Fx  | Fyc  | Fxc  | Fax  | Ftg | Miax  | Mitg | MT   | PT    |
|-----|-------|------|-----|------|------|------|-----|-------|------|------|-------|
| [m] | [N]   | [N]  | [N] | [N]  | [N]  | [N]  | [N] | [Nm]  | [Nm] | [Nm] | [W]   |
| 2.2 | 150.4 | 25.5 | 3.6 | 25.7 | -2.2 | 25.4 | 4.4 | 0.0   | 0.0  | 9.4  | 125.8 |
| 2.0 | 154.6 | 25.1 | 3.7 | 25.2 | -2.4 | 24.9 | 4.8 | 4.6   | 0.8  | 9.5  | 126.9 |
| 1.8 | 155.2 | 24.2 | 3.6 | 24.3 | -2.6 | 23.9 | 5.2 | 13.6  | 2.4  | 9.4  | 125.6 |
| 1.6 | 152.3 | 23.1 | 3.7 | 23.2 | -2.6 | 22.7 | 5.5 | 26.9  | 5.0  | 9.0  | 119.5 |
| 1.4 | 145.9 | 21.8 | 3.7 | 21.9 | -2.7 | 21.3 | 5.9 | 44.4  | 8.6  | 8.5  | 113.3 |
| 1.3 | 136.1 | 20.1 | 3.6 | 20.2 | -2.8 | 19.4 | 6.3 | 65.6  | 13.3 | 7.9  | 105.1 |
| 1.1 | 123.1 | 18.2 | 3.3 | 18.3 | -2.9 | 17.3 | 6.6 | 90.4  | 19.1 | 7.1  | 94.7  |
| 0.9 | 107.3 | 16.0 | 3.0 | 16.1 | -2.9 | 14.8 | 6.9 | 118.2 | 26.0 | 6.2  | 82.6  |
| 0.7 | 88.9  | 13.5 | 2.6 | 13.5 | -2.6 | 11.9 | 6.9 | 148.7 | 34.2 | 4.9  | 65.8  |
| 0.5 | 68.4  | 10.4 | 1.8 | 10.4 | -2.1 | 8.4  | 6.4 | 181.4 | 43.7 | 3.5  | 46.2  |

SumFCF[N]= 1282.22 sumMT[Nm]= 75.42135 sumPT[W]= 1005.618

Puterea la arbore pentru turbina cu z palete[kW]= 4.022472

#### INCARCARI SI EFORTURI

| r     | FCF   | Miyc    | Mixc    | Sigmatr                | Sigmaiy                | Sigmaix                |
|-------|-------|---------|---------|------------------------|------------------------|------------------------|
| [m]   | [daN] | [daNcm] | [daNcm] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] |
| 2.160 | 15    | 0       | 0       | 1                      | 0                      | 0                      |
| 1.980 | 30    | 45      | 12      | 2                      | 3                      | 0                      |
| 1.800 | 46    | 135     | 39      | 3                      | 7                      | 1                      |
| 1.620 | 61    | 267     | 84      | 4                      | 10                     | 1                      |
| 1.440 | 76    | 439     | 150     | 4                      | 14                     | 2                      |
| 1.260 | 89    | 646     | 244     | 5                      | 17                     | 2                      |
| 1.080 | 102   | 884     | 373     | 5                      | 20                     | 3                      |
| 0.900 | 112   | 1144    | 551     | 6                      | 22                     | 4                      |
| 0.720 | 121   | 1408    | 804     | 6                      | 24                     | 6                      |
| 0.540 | 128   | 1634    | 1182    | 6                      | 24                     | 8                      |

Evaluari ale sollicitarilor la incastrare

Miaxb[Nm]= 245.9984 Mitgb[Nm]= 63.65505 FCFb[N]= 1482.22

#### Rezultatele din fișierul STPALR451

REZULTATE ALE CALCULELOR STATICE PENTRU TURBINA MARGA

PROGRAM STPALR.BAS REZULTATE STPALR451

uR[m/s]= 28.8 vAM[m/s+ 11.7 v[m/s]= 9.945 LAMB0= 2.461539 RO[kg/m<sup>3</sup>]= 1.225

ROPAFS[kg/dm<sup>3</sup>]= 1.85

Grosimea stratului din PAFS s[mm]= 3 nr.palete= 5

| R[m]  | lc[mm]  | dr[-] | betinst | betinf | INC[gr] | Delint[mm] | lint[mm] | drint[-] |
|-------|---------|-------|---------|--------|---------|------------|----------|----------|
| 2.160 | 210.240 | 0.127 | 4.944   | 17.895 | 12.951  | 21.944     | 188.296  | 0.110    |
| 1.980 | 230.220 | 0.142 | 5.576   | 19.300 | 13.724  | 20.432     | 209.788  | 0.127    |
| 1.800 | 250.200 | 0.156 | 6.333   | 20.932 | 14.599  | 18.920     | 231.280  | 0.143    |
| 1.620 | 270.180 | 0.170 | 7.259   | 22.851 | 15.592  | 17.408     | 252.772  | 0.158    |
| 1.440 | 290.160 | 0.185 | 8.417   | 25.132 | 16.716  | 15.896     | 274.264  | 0.174    |
| 1.260 | 310.140 | 0.199 | 9.905   | 27.879 | 17.974  | 14.384     | 295.756  | 0.189    |
| 1.080 | 330.120 | 0.214 | 11.889  | 31.234 | 19.345  | 12.872     | 317.248  | 0.203    |
| 0.900 | 350.100 | 0.228 | 14.667  | 35.389 | 20.723  | 11.360     | 338.740  | 0.218    |
| 0.720 | 370.080 | 0.242 | 18.833  | 40.609 | 21.775  | 9.848      | 360.232  | 0.232    |
| 0.540 | 390.060 | 0.257 | 25.778  | 47.230 | 21.452  | 8.336      | 381.724  | 0.247    |

#### SINTEZE ALE CARACTERISTICILOR GEOMETRICE

| r(i) | u(i)  | Ss(i)              | Jxs(i)             | Wxs(i)             | Jys(i)             | Wys(i)             | Delmas(i) |
|------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|-----------|
| [m]  | [m/s] | [cm <sup>2</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [kg]      |

|      |       |       |        |       |         |        |      |
|------|-------|-------|--------|-------|---------|--------|------|
| 2.16 | 28.80 | 11.76 | 17.09  | 12.78 | 463.81  | 44.12  | 0.39 |
| 1.98 | 26.40 | 13.19 | 26.75  | 16.41 | 641.48  | 55.73  | 0.44 |
| 1.80 | 24.00 | 14.57 | 40.27  | 20.63 | 854.37  | 68.29  | 0.49 |
| 1.62 | 21.60 | 15.88 | 58.64  | 25.48 | 1101.62 | 81.55  | 0.53 |
| 1.44 | 19.20 | 17.11 | 82.98  | 30.95 | 1380.44 | 95.15  | 0.57 |
| 1.26 | 16.80 | 18.24 | 114.50 | 37.07 | 1685.81 | 108.71 | 0.61 |
| 1.08 | 14.40 | 19.26 | 154.52 | 43.83 | 2010.23 | 121.79 | 0.64 |
| 0.90 | 12.00 | 20.14 | 204.39 | 51.21 | 2343.39 | 133.87 | 0.67 |
| 0.72 | 9.60  | 20.86 | 265.51 | 59.20 | 2671.94 | 144.40 | 0.69 |
| 0.54 | 7.20  | 21.41 | 339.27 | 67.74 | 2979.16 | 152.75 | 0.71 |

Masa totala a paletei [kg] 5.741491

#### AFISAJE PENTRU FORTE

| R   | FCF   | Fy   | Fx  | Fyc  | Fxc  | Fax  | Ftg | Miax  | Mitg | MT   | PT    |
|-----|-------|------|-----|------|------|------|-----|-------|------|------|-------|
| [m] | [N]   | [N]  | [N] | [N]  | [N]  | [N]  | [N] | [Nm]  | [Nm] | [Nm] | [W]   |
| 2.2 | 150.4 | 25.5 | 3.6 | 25.7 | -2.2 | 25.4 | 4.4 | 0.0   | 0.0  | 9.4  | 125.8 |
| 2.0 | 154.6 | 25.1 | 3.7 | 25.2 | -2.4 | 24.9 | 4.8 | 4.6   | 0.8  | 9.5  | 126.9 |
| 1.8 | 155.2 | 24.2 | 3.6 | 24.3 | -2.6 | 23.9 | 5.2 | 13.6  | 2.4  | 9.4  | 125.6 |
| 1.6 | 152.3 | 23.1 | 3.7 | 23.2 | -2.6 | 22.7 | 5.5 | 26.9  | 5.0  | 9.0  | 119.5 |
| 1.4 | 145.9 | 21.8 | 3.7 | 21.9 | -2.7 | 21.3 | 5.9 | 44.4  | 8.6  | 8.5  | 113.3 |
| 1.3 | 136.1 | 20.1 | 3.6 | 20.2 | -2.8 | 19.4 | 6.3 | 65.6  | 13.3 | 7.9  | 105.1 |
| 1.1 | 123.1 | 18.2 | 3.3 | 18.3 | -2.9 | 17.3 | 6.6 | 90.4  | 19.1 | 7.1  | 94.7  |
| 0.9 | 107.3 | 16.0 | 3.0 | 16.1 | -2.9 | 14.8 | 6.9 | 118.2 | 26.0 | 6.2  | 82.6  |
| 0.7 | 88.9  | 13.5 | 2.6 | 13.5 | -2.6 | 11.9 | 6.9 | 148.7 | 34.2 | 4.9  | 65.8  |
| 0.5 | 68.4  | 10.4 | 1.8 | 10.4 | -2.1 | 8.4  | 6.4 | 181.4 | 43.7 | 3.5  | 46.2  |

SumFCF[N]= 1282.22 sumMT[Nm]= 75.42135 sumPT[W]= 1005.618

Puterea la arbore pentru turbina cu z palete[kW]= 5.02809

#### INCARCARI SI EFORTURI

| r     | FCF   | Miyc    | Mixc    | Sigmatr                | Sigmaiy                | Sigmaix                |
|-------|-------|---------|---------|------------------------|------------------------|------------------------|
| [m]   | [daN] | [daNcm] | [daNcm] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] |
| 2.160 | 15    | 0       | 0       | 1                      | 0                      | 0                      |
| 1.980 | 30    | 45      | 12      | 2                      | 3                      | 0                      |
| 1.800 | 46    | 135     | 39      | 3                      | 7                      | 1                      |
| 1.620 | 61    | 267     | 84      | 4                      | 10                     | 1                      |
| 1.440 | 76    | 439     | 150     | 4                      | 14                     | 2                      |
| 1.260 | 89    | 646     | 244     | 5                      | 17                     | 2                      |
| 1.080 | 102   | 884     | 373     | 5                      | 20                     | 3                      |
| 0.900 | 112   | 1144    | 551     | 6                      | 22                     | 4                      |
| 0.720 | 121   | 1408    | 804     | 6                      | 24                     | 6                      |
| 0.540 | 128   | 1634    | 1182    | 6                      | 24                     | 8                      |

Evaluari ale solicitarilor la incastrare

Miaxb[Nm]= 245.9984 Mitgb[Nm]= 63.65505 FCFb[N]= 1482.22

#### Rezultatele din fisierul STPALR461

REZULTATE ALE CALCULELOR STATICE PENTRU TURBINA MARGA

PROGRAM STPALR.BAS REZULTATE STPALR461

uR[m/s]= 28.8 vAM[m/s+ 11.7 v[m/s]= 9.945 LAMB0= 2.461539 RO[kg/m<sup>3</sup>]= 1.225

ROPAFS[kg/dm<sup>3</sup>]= 1.85

Grosimea stratului din PAFS s[mm]= 3 nr.palete= 6

| R[m]  | lc[mm]  | dr[-] | betinst | betinf | INC[gr] | Delint[mm] | lint[mm] | drint[-] |
|-------|---------|-------|---------|--------|---------|------------|----------|----------|
| 2.160 | 210.240 | 0.127 | 4.944   | 17.895 | 12.951  | 21.944     | 188.296  | 0.110    |

|       |         |       |        |        |        |        |         |       |
|-------|---------|-------|--------|--------|--------|--------|---------|-------|
| 1.980 | 230.220 | 0.142 | 5.576  | 19.300 | 13.724 | 20.432 | 209.788 | 0.127 |
| 1.800 | 250.200 | 0.156 | 6.333  | 20.932 | 14.599 | 18.920 | 231.280 | 0.143 |
| 1.620 | 270.180 | 0.170 | 7.259  | 22.851 | 15.592 | 17.408 | 252.772 | 0.158 |
| 1.440 | 290.160 | 0.185 | 8.417  | 25.132 | 16.716 | 15.896 | 274.264 | 0.174 |
| 1.260 | 310.140 | 0.199 | 9.905  | 27.879 | 17.974 | 14.384 | 295.756 | 0.189 |
| 1.080 | 330.120 | 0.214 | 11.889 | 31.234 | 19.345 | 12.872 | 317.248 | 0.203 |
| 0.900 | 350.100 | 0.228 | 14.667 | 35.389 | 20.723 | 11.360 | 338.740 | 0.218 |
| 0.720 | 370.080 | 0.242 | 18.833 | 40.609 | 21.775 | 9.848  | 360.232 | 0.232 |
| 0.540 | 390.060 | 0.257 | 25.778 | 47.230 | 21.452 | 8.336  | 381.724 | 0.247 |

## SINTEZE ALE CARACTERISTICILOR GEOMETRICE

| r(i) | u(i)  | Ss(i)              | Jxs(i)             | Wxs(i)             | Jys(i)             | Wys(i)             | Delmas(i) |
|------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|-----------|
| [m]  | [m/s] | [cm <sup>2</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [kg]      |
| 2.16 | 28.80 | 11.76              | 17.09              | 12.78              | 463.81             | 44.12              | 0.39      |
| 1.98 | 26.40 | 13.19              | 26.75              | 16.41              | 641.48             | 55.73              | 0.44      |
| 1.80 | 24.00 | 14.57              | 40.27              | 20.63              | 854.37             | 68.29              | 0.49      |
| 1.62 | 21.60 | 15.88              | 58.64              | 25.48              | 1101.62            | 81.55              | 0.53      |
| 1.44 | 19.20 | 17.11              | 82.98              | 30.95              | 1380.44            | 95.15              | 0.57      |
| 1.26 | 16.80 | 18.24              | 114.50             | 37.07              | 1685.81            | 108.71             | 0.61      |
| 1.08 | 14.40 | 19.26              | 154.52             | 43.83              | 2010.23            | 121.79             | 0.64      |
| 0.90 | 12.00 | 20.14              | 204.39             | 51.21              | 2343.39            | 133.87             | 0.67      |
| 0.72 | 9.60  | 20.86              | 265.51             | 59.20              | 2671.94            | 144.40             | 0.69      |
| 0.54 | 7.20  | 21.41              | 339.27             | 67.74              | 2979.16            | 152.75             | 0.71      |

Masa totala a paletei [kg] 5.741491

## AFISAJE PENTRU FORTE

| R   | FCF   | Fy   | Fx  | Fyc  | Fxc  | Fax  | Ftg | Miax  | Mitg | MT   | PT    |
|-----|-------|------|-----|------|------|------|-----|-------|------|------|-------|
| [m] | [N]   | [N]  | [N] | [N]  | [N]  | [N]  | [N] | [Nm]  | [Nm] | [Nm] | [W]   |
| 2.2 | 150.4 | 25.5 | 3.6 | 25.7 | -2.2 | 25.4 | 4.4 | 0.0   | 0.0  | 9.4  | 125.8 |
| 2.0 | 154.6 | 25.1 | 3.7 | 25.2 | -2.4 | 24.9 | 4.8 | 4.6   | 0.8  | 9.5  | 126.9 |
| 1.8 | 155.2 | 24.2 | 3.6 | 24.3 | -2.6 | 23.9 | 5.2 | 13.6  | 2.4  | 9.4  | 125.6 |
| 1.6 | 152.3 | 23.1 | 3.7 | 23.2 | -2.6 | 22.7 | 5.5 | 26.9  | 5.0  | 9.0  | 119.5 |
| 1.4 | 145.9 | 21.8 | 3.7 | 21.9 | -2.7 | 21.3 | 5.9 | 44.4  | 8.6  | 8.5  | 113.3 |
| 1.3 | 136.1 | 20.1 | 3.6 | 20.2 | -2.8 | 19.4 | 6.3 | 65.6  | 13.3 | 7.9  | 105.1 |
| 1.1 | 123.1 | 18.2 | 3.3 | 18.3 | -2.9 | 17.3 | 6.6 | 90.4  | 19.1 | 7.1  | 94.7  |
| 0.9 | 107.3 | 16.0 | 3.0 | 16.1 | -2.9 | 14.8 | 6.9 | 118.2 | 26.0 | 6.2  | 82.6  |
| 0.7 | 88.9  | 13.5 | 2.6 | 13.5 | -2.6 | 11.9 | 6.9 | 148.7 | 34.2 | 4.9  | 65.8  |
| 0.5 | 68.4  | 10.4 | 1.8 | 10.4 | -2.1 | 8.4  | 6.4 | 181.4 | 43.7 | 3.5  | 46.2  |

SumFCF[N]= 1282.22 sumMT[Nm]= 75.42135 sumPT[W]= 1005.618

Puterea la arbore pentru turbina cu z palete[kW]= 6.033708

## INCARCARI SI EFORTURI

| r     | FCF   | Miyc    | Mixc    | Sigmatr                | Sigmaiy                | Sigmaix                |
|-------|-------|---------|---------|------------------------|------------------------|------------------------|
| [m]   | [daN] | [daNcm] | [daNcm] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] |
| 2.160 | 15    | 0       | 0       | 1                      | 0                      | 0                      |
| 1.980 | 30    | 45      | 12      | 2                      | 3                      | 0                      |
| 1.800 | 46    | 135     | 39      | 3                      | 7                      | 1                      |
| 1.620 | 61    | 267     | 84      | 4                      | 10                     | 1                      |
| 1.440 | 76    | 439     | 150     | 4                      | 14                     | 2                      |
| 1.260 | 89    | 646     | 244     | 5                      | 17                     | 2                      |
| 1.080 | 102   | 884     | 373     | 5                      | 20                     | 3                      |
| 0.900 | 112   | 1144    | 551     | 6                      | 22                     | 4                      |
| 0.720 | 121   | 1408    | 804     | 6                      | 24                     | 6                      |

0.540 128 1634 1182 6 24 8

Evaluari ale solicitărilor la incastrare

Mi<sub>axb</sub>[Nm]= 245.9984 Mit<sub>gb</sub>[Nm]= 63.65505 FCF<sub>b</sub>[N]= 1482.22

### Rezultatele din fișierul STPALR331

REZULTATE ALE CALCULELOR STATICE PENTRU TURBINA MARGA

PROGRAM STPALR.BAS REZULTATE STPALR331

u<sub>R</sub>[m/s]= 28.8 v<sub>AM</sub>[m/s+ 9.6 v[m/s]= 8.160001 LAMB<sub>0</sub>= 3 RO[kg/m<sup>3</sup>]= 1.225

ROP<sub>AFS</sub>[kg/dm<sup>3</sup>]= 1.85

Grosimea stratului din PAFS s[mm]= 3 nr.palete= 3

| R[m]  | lc[mm]  | dr[-] | betinst | betinf | INC[gr] | Delint[mm] | lint[mm] | drint[-] |
|-------|---------|-------|---------|--------|---------|------------|----------|----------|
| 2.160 | 210.240 | 0.127 | 4.944   | 14.839 | 9.895   | 21.944     | 188.296  | 0.110    |
| 1.980 | 230.220 | 0.142 | 5.576   | 16.031 | 10.455  | 20.432     | 209.788  | 0.127    |
| 1.800 | 250.200 | 0.156 | 6.333   | 17.425 | 11.091  | 18.920     | 231.280  | 0.143    |
| 1.620 | 270.180 | 0.170 | 7.259   | 19.074 | 11.815  | 17.408     | 252.772  | 0.158    |
| 1.440 | 290.160 | 0.185 | 8.417   | 21.053 | 12.636  | 15.896     | 274.264  | 0.174    |
| 1.260 | 310.140 | 0.199 | 9.905   | 23.464 | 13.559  | 14.384     | 295.756  | 0.189    |
| 1.080 | 330.120 | 0.214 | 11.889  | 26.454 | 14.565  | 12.872     | 317.248  | 0.203    |
| 0.900 | 350.100 | 0.228 | 14.667  | 30.237 | 15.570  | 11.360     | 338.740  | 0.218    |
| 0.720 | 370.080 | 0.242 | 18.833  | 35.125 | 16.292  | 9.848      | 360.232  | 0.232    |
| 0.540 | 390.060 | 0.257 | 25.778  | 41.573 | 15.795  | 8.336      | 381.724  | 0.247    |

### SINTEZE ALE CARACTERISTICILOR GEOMETRICE

| r(i) | u(i)  | Ss(i)              | Jxs(i)             | Wxs(i)             | Jys(i)             | Wys(i)             | Delmas(i) |
|------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|-----------|
| [m]  | [m/s] | [cm <sup>2</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [kg]      |
| 2.16 | 28.80 | 11.76              | 17.09              | 12.78              | 463.81             | 44.12              | 0.39      |
| 1.98 | 26.40 | 13.19              | 26.75              | 16.41              | 641.48             | 55.73              | 0.44      |
| 1.80 | 24.00 | 14.57              | 40.27              | 20.63              | 854.37             | 68.29              | 0.49      |
| 1.62 | 21.60 | 15.88              | 58.64              | 25.48              | 1101.62            | 81.55              | 0.53      |
| 1.44 | 19.20 | 17.11              | 82.98              | 30.95              | 1380.44            | 95.15              | 0.57      |
| 1.26 | 16.80 | 18.24              | 114.50             | 37.07              | 1685.81            | 108.71             | 0.61      |
| 1.08 | 14.40 | 19.26              | 154.52             | 43.83              | 2010.23            | 121.79             | 0.64      |
| 0.90 | 12.00 | 20.14              | 204.39             | 51.21              | 2343.39            | 133.87             | 0.67      |
| 0.72 | 9.60  | 20.86              | 265.51             | 59.20              | 2671.94            | 144.40             | 0.69      |
| 0.54 | 7.20  | 21.41              | 339.27             | 67.74              | 2979.16            | 152.75             | 0.71      |

Masa totala a paletelor [kg] 5.741491

### AFISAJE PENTRU FORTE

| R   | FCF   | Fy   | Fx  | Fyc  | Fxc  | Fax  | Ftg | Mi <sub>ax</sub> | Mit <sub>g</sub> | MT   | PT   |
|-----|-------|------|-----|------|------|------|-----|------------------|------------------|------|------|
| [m] | [N]   | [N]  | [N] | [N]  | [N]  | [N]  | [N] | [Nm]             | [Nm]             | [Nm] | [W]  |
| 2.2 | 150.4 | 24.7 | 3.5 | 24.9 | -0.8 | 24.8 | 2.9 | 0.0              | 0.0              | 6.3  | 84.0 |
| 2.0 | 154.6 | 24.2 | 3.5 | 24.4 | -0.9 | 24.2 | 3.3 | 4.5              | 0.5              | 6.5  | 86.1 |
| 1.8 | 155.2 | 23.1 | 3.5 | 23.4 | -1.0 | 23.1 | 3.6 | 13.3             | 1.6              | 6.5  | 86.6 |
| 1.6 | 152.3 | 21.9 | 3.5 | 22.2 | -1.0 | 21.9 | 3.8 | 26.3             | 3.4              | 6.2  | 82.7 |
| 1.4 | 145.9 | 20.5 | 3.5 | 20.7 | -1.1 | 20.3 | 4.1 | 43.2             | 5.8              | 5.9  | 79.1 |
| 1.3 | 136.1 | 18.7 | 3.3 | 18.9 | -1.2 | 18.4 | 4.4 | 63.8             | 9.0              | 5.5  | 74.0 |
| 1.1 | 123.1 | 16.6 | 3.1 | 16.8 | -1.2 | 16.2 | 4.7 | 87.7             | 13.0             | 5.0  | 67.2 |
| 0.9 | 107.3 | 14.3 | 2.6 | 14.5 | -1.3 | 13.7 | 4.9 | 114.5            | 17.8             | 4.4  | 59.0 |
| 0.7 | 88.9  | 11.7 | 2.2 | 11.8 | -1.1 | 10.8 | 4.9 | 143.8            | 23.6             | 3.5  | 47.0 |
| 0.5 | 68.4  | 8.6  | 1.5 | 8.7  | -0.9 | 7.4  | 4.6 | 175.0            | 30.1             | 2.5  | 33.0 |

SumFCF[N]= 1282.22 sumMT[Nm]= 52.39233 sumPT[W]= 698.5643

Puterea la arbore pentru turbina cu z palete[kW]= 2.095693



## INCARCARI SI EFORTURI

| r     | FCF   | Miyc    | Mixc    | Sigmatr                | Sigmaiy                | Sigmaix                |
|-------|-------|---------|---------|------------------------|------------------------|------------------------|
| [m]   | [daN] | [daNcm] | [daNcm] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] |
| 2.160 | 15    | 0       | 0       | 1                      | 0                      | 0                      |
| 1.980 | 30    | 44      | 10      | 2                      | 3                      | 0                      |
| 1.800 | 46    | 132     | 31      | 3                      | 6                      | 0                      |
| 1.620 | 61    | 260     | 67      | 4                      | 10                     | 1                      |
| 1.440 | 76    | 427     | 121     | 4                      | 14                     | 1                      |
| 1.260 | 89    | 628     | 199     | 5                      | 17                     | 2                      |
| 1.080 | 102   | 858     | 308     | 5                      | 20                     | 3                      |
| 0.900 | 112   | 1107    | 463     | 6                      | 22                     | 3                      |
| 0.720 | 121   | 1361    | 687     | 6                      | 23                     | 5                      |
| 0.540 | 128   | 1576    | 1032    | 6                      | 23                     | 7                      |

Evaluari ale sollicitarilor la incastrare

MiAXB[Nm]= 236.4852 Mitgb[Nm]= 44.15426 FCFb[N]= 1482.22

**Rezultatele din fișierul STPALR332**

REZULTATE ALE CALCULELOR STATICE PENTRU TURBINA MARGA

PROGRAM STPALR.BAS REZULTATE STPALR332

uR[m/s]= 38.4 vAM[m/s+ 9.6 v[m/s]= 8.160001 LAMB0= 4 RO[kg/m<sup>3</sup>]= 1.225

ROPAFS[kg/dm<sup>3</sup>]= 1.85

Grosimea stratului din PAFS s[mm]= 3 nr.palete= 3

| R[m]  | lc[mm]  | dr[-] | betinst | betinf | INC[gr] | Delint[mm] | lint[mm] | drint[-] |
|-------|---------|-------|---------|--------|---------|------------|----------|----------|
| 2.160 | 210.240 | 0.127 | 4.944   | 11.419 | 6.475   | 21.944     | 188.296  | 0.110    |
| 1.980 | 230.220 | 0.142 | 5.576   | 12.373 | 6.797   | 20.432     | 209.788  | 0.127    |
| 1.800 | 250.200 | 0.156 | 6.333   | 13.496 | 7.163   | 18.920     | 231.280  | 0.143    |
| 1.620 | 270.180 | 0.170 | 7.259   | 14.839 | 7.580   | 17.408     | 252.772  | 0.158    |
| 1.440 | 290.160 | 0.185 | 8.417   | 16.471 | 8.054   | 15.896     | 274.264  | 0.174    |
| 1.260 | 310.140 | 0.199 | 9.905   | 18.492 | 8.587   | 14.384     | 295.756  | 0.189    |
| 1.080 | 330.120 | 0.214 | 11.889  | 21.053 | 9.164   | 12.872     | 317.248  | 0.203    |
| 0.900 | 350.100 | 0.228 | 14.667  | 24.387 | 9.720   | 11.360     | 338.740  | 0.218    |
| 0.720 | 370.080 | 0.242 | 18.833  | 28.871 | 10.038  | 9.848      | 360.232  | 0.232    |
| 0.540 | 390.060 | 0.257 | 25.778  | 35.125 | 9.348   | 8.336      | 381.724  | 0.247    |

## SINTEZE ALE CARACTERISTICILOR GEOMETRICE

| r(i) | u(i)  | Ss(i)              | Jxs(i)             | Wxs(i)             | Jys(i)             | Wys(i)             | Delmas(i) |
|------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|-----------|
| [m]  | [m/s] | [cm <sup>2</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [kg]      |
| 2.16 | 38.40 | 11.76              | 17.09              | 12.78              | 463.81             | 44.12              | 0.39      |
| 1.98 | 35.20 | 13.19              | 26.75              | 16.41              | 641.48             | 55.73              | 0.44      |
| 1.80 | 32.00 | 14.57              | 40.27              | 20.63              | 854.37             | 68.29              | 0.49      |
| 1.62 | 28.80 | 15.88              | 58.64              | 25.48              | 1101.62            | 81.55              | 0.53      |
| 1.44 | 25.60 | 17.11              | 82.98              | 30.95              | 1380.44            | 95.15              | 0.57      |
| 1.26 | 22.40 | 18.24              | 114.50             | 37.07              | 1685.81            | 108.71             | 0.61      |
| 1.08 | 19.20 | 19.26              | 154.52             | 43.83              | 2010.23            | 121.79             | 0.64      |
| 0.90 | 16.00 | 20.14              | 204.39             | 51.21              | 2343.39            | 133.87             | 0.67      |
| 0.72 | 12.80 | 20.86              | 265.51             | 59.20              | 2671.94            | 144.40             | 0.69      |
| 0.54 | 9.60  | 21.41              | 339.27             | 67.74              | 2979.16            | 152.75             | 0.71      |

Masa totala a paletei [kg] 5.741491

## AFISAJE PENTRU FORTE

| R   | FCF | Fy  | Fx  | Fyc | Fxc | Fax | Ftg | MiAx | Mitg | MT   | PT  |
|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|-----|
| [m] | [N] | [N] | [N] | [N] | [N] | [N] | [N] | [Nm] | [Nm] | [Nm] | [W] |

|     |       |      |     |      |     |      |     |       |      |     |       |
|-----|-------|------|-----|------|-----|------|-----|-------|------|-----|-------|
| 2.2 | 267.3 | 41.3 | 5.9 | 41.7 | 1.2 | 41.7 | 2.4 | 0.0   | 0.0  | 5.2 | 92.0  |
| 2.0 | 274.8 | 40.1 | 5.9 | 40.5 | 1.1 | 40.5 | 2.8 | 7.5   | 0.4  | 5.6 | 100.1 |
| 1.8 | 275.9 | 38.1 | 5.7 | 38.5 | 0.9 | 38.4 | 3.3 | 22.3  | 1.4  | 6.0 | 106.2 |
| 1.6 | 270.8 | 35.7 | 5.7 | 36.1 | 1.0 | 36.0 | 3.6 | 44.0  | 2.9  | 5.8 | 103.2 |
| 1.4 | 259.4 | 32.9 | 5.6 | 33.3 | 0.9 | 33.1 | 4.0 | 72.2  | 5.1  | 5.7 | 101.9 |
| 1.3 | 241.9 | 29.4 | 5.2 | 29.9 | 0.8 | 29.6 | 4.4 | 106.3 | 8.0  | 5.5 | 98.5  |
| 1.1 | 218.9 | 25.5 | 4.7 | 26.0 | 0.6 | 25.5 | 4.8 | 145.7 | 11.7 | 5.2 | 92.0  |
| 0.9 | 190.7 | 21.3 | 3.9 | 21.6 | 0.3 | 21.0 | 5.2 | 189.8 | 16.3 | 4.7 | 83.3  |
| 0.7 | 158.1 | 16.5 | 3.1 | 16.8 | 0.2 | 16.0 | 5.2 | 237.6 | 21.7 | 3.8 | 67.0  |
| 0.5 | 121.7 | 11.4 | 2.0 | 11.6 | 0.1 | 10.5 | 4.9 | 288.3 | 28.2 | 2.7 | 47.4  |

SumFCF[N]= 2279.503 sumMT[Nm]= 50.15678 sumPT[W]= 891.6761

Puterea la arbore pentru turbina cu z palete[kW]= 2.675028

#### INCARCARI SI EFORTURI

| r     | FCF   | Miyc    | Mixc    | Sigmatr                | Sigmaiy                | Sigmaix                |
|-------|-------|---------|---------|------------------------|------------------------|------------------------|
| [m]   | [daN] | [daNcm] | [daNcm] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] |
| 2.160 | 27    | 0       | 0       | 2                      | 0                      | 0                      |
| 1.980 | 54    | 75      | 12      | 4                      | 5                      | 0                      |
| 1.800 | 82    | 222     | 38      | 6                      | 11                     | 1                      |
| 1.620 | 109   | 436     | 85      | 7                      | 17                     | 1                      |
| 1.440 | 135   | 714     | 156     | 8                      | 23                     | 2                      |
| 1.260 | 159   | 1047    | 262     | 9                      | 28                     | 2                      |
| 1.080 | 181   | 1426    | 415     | 9                      | 33                     | 3                      |
| 0.900 | 200   | 1836    | 638     | 10                     | 36                     | 5                      |
| 0.720 | 216   | 2249    | 973     | 10                     | 38                     | 7                      |
| 0.540 | 228   | 2596    | 1508    | 11                     | 38                     | 10                     |

Evaluari ale solicitărilor la incastrare

Miaxb[Nm]= 387.6343 Mitgb[Nm]= 42.01774 FCFb[N]= 2479.503

#### Rezultatele din fișierul STPALR333

REZULTATE ALE CALCULELOR STATICE PENTRU TURBINA MARGA

PROGRAM STPALR.BAS REZULTATE STPALR333

uR[m/s]= 48 vAM[m/s+ 9.6 v[m/s]= 8.160001 LAMB0= 5 RO[kg/m<sup>3</sup>]= 1.225

ROPAFS[kg/dm<sup>3</sup>]= 1.85

Grosimea stratului din PAFS s[mm]= 3 nr.palete= 3

| R[m]  | lc[mm]  | dr[-] | betinst | betinf | INC[gr] | Delint[mm] | lint[mm] | drint[-] |
|-------|---------|-------|---------|--------|---------|------------|----------|----------|
| 2.160 | 210.240 | 0.127 | 4.944   | 9.269  | 4.325   | 21.944     | 188.296  | 0.110    |
| 1.980 | 230.220 | 0.142 | 5.576   | 10.059 | 4.484   | 20.432     | 209.788  | 0.127    |
| 1.800 | 250.200 | 0.156 | 6.333   | 10.995 | 4.662   | 18.920     | 231.280  | 0.143    |
| 1.620 | 270.180 | 0.170 | 7.259   | 12.120 | 4.861   | 17.408     | 252.772  | 0.158    |
| 1.440 | 290.160 | 0.185 | 8.417   | 13.496 | 5.079   | 15.896     | 274.264  | 0.174    |
| 1.260 | 310.140 | 0.199 | 9.905   | 15.217 | 5.312   | 14.384     | 295.756  | 0.189    |
| 1.080 | 330.120 | 0.214 | 11.889  | 17.425 | 5.536   | 12.872     | 317.248  | 0.203    |
| 0.900 | 350.100 | 0.228 | 14.667  | 20.351 | 5.684   | 11.360     | 338.740  | 0.218    |
| 0.720 | 370.080 | 0.242 | 18.833  | 24.387 | 5.554   | 9.848      | 360.232  | 0.232    |
| 0.540 | 390.060 | 0.257 | 25.778  | 30.237 | 4.459   | 8.336      | 381.724  | 0.247    |

#### SINTEZE ALE CARACTERISTICILOR GEOMETRICE

| r(i) | u(i)  | Ss(i)              | Jxs(i)             | Wxs(i)             | Jys(i)             | Wys(i)             | Delmas(i) |
|------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|-----------|
| [m]  | [m/s] | [cm <sup>2</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [kg]      |
| 2.16 | 48.00 | 11.76              | 17.09              | 12.78              | 463.81             | 44.12              | 0.39      |
| 1.98 | 44.00 | 13.19              | 26.75              | 16.41              | 641.48             | 55.73              | 0.44      |

|      |       |       |        |       |         |        |      |
|------|-------|-------|--------|-------|---------|--------|------|
| 1.80 | 40.00 | 14.57 | 40.27  | 20.63 | 854.37  | 68.29  | 0.49 |
| 1.62 | 36.00 | 15.88 | 58.64  | 25.48 | 1101.62 | 81.55  | 0.53 |
| 1.44 | 32.00 | 17.11 | 82.98  | 30.95 | 1380.44 | 95.15  | 0.57 |
| 1.26 | 28.00 | 18.24 | 114.50 | 37.07 | 1685.81 | 108.71 | 0.61 |
| 1.08 | 24.00 | 19.26 | 154.52 | 43.83 | 2010.23 | 121.79 | 0.64 |
| 0.90 | 20.00 | 20.14 | 204.39 | 51.21 | 2343.39 | 133.87 | 0.67 |
| 0.72 | 16.00 | 20.86 | 265.51 | 59.20 | 2671.94 | 144.40 | 0.69 |
| 0.54 | 12.00 | 21.41 | 339.27 | 67.74 | 2979.16 | 152.75 | 0.71 |

Masa totala a paletelor [kg] 5.741491

#### AFISAJE PENTRU FORTE

| R   | FCF   | Fy   | Fx  | Fyc  | Fxc | Fax  | Ftg | Miax  | Mitg | MT   | PT    |
|-----|-------|------|-----|------|-----|------|-----|-------|------|------|-------|
| [m] | [N]   | [N]  | [N] | [N]  | [N] | [N]  | [N] | [Nm]  | [Nm] | [Nm] | [W]   |
| 2.2 | 417.7 | 62.5 | 8.9 | 63.0 | 4.2 | 63.1 | 1.3 | 0.0   | 0.0  | 2.7  | 60.2  |
| 2.0 | 429.4 | 60.4 | 8.9 | 60.9 | 4.1 | 61.0 | 1.8 | 11.4  | 0.2  | 3.6  | 80.1  |
| 1.8 | 431.2 | 57.1 | 8.6 | 57.6 | 3.9 | 57.7 | 2.5 | 33.7  | 0.8  | 4.4  | 98.2  |
| 1.6 | 423.1 | 53.1 | 8.5 | 53.6 | 4.0 | 53.7 | 2.8 | 66.4  | 1.8  | 4.5  | 100.4 |
| 1.4 | 405.2 | 48.5 | 8.2 | 49.0 | 3.9 | 49.1 | 3.3 | 108.8 | 3.3  | 4.8  | 106.6 |
| 1.3 | 378.0 | 43.0 | 7.6 | 43.5 | 3.6 | 43.5 | 3.9 | 160.0 | 5.4  | 5.0  | 110.4 |
| 1.1 | 342.0 | 36.8 | 6.8 | 37.2 | 3.2 | 37.1 | 4.6 | 219.0 | 8.2  | 4.9  | 109.4 |
| 0.9 | 298.0 | 30.0 | 5.5 | 30.4 | 2.5 | 30.0 | 5.2 | 284.7 | 11.8 | 4.7  | 104.8 |
| 0.7 | 247.0 | 22.6 | 4.3 | 22.9 | 2.1 | 22.4 | 5.4 | 355.9 | 16.4 | 3.9  | 86.8  |
| 0.5 | 190.1 | 14.9 | 2.6 | 15.1 | 1.4 | 14.2 | 5.3 | 431.0 | 21.9 | 2.8  | 63.1  |

SumFCF[N]= 3561.722 sumMT[Nm]= 41.40163 sumPT[W]= 920.0361

Puterea la arbore pentru turbina cu z paletelor[kW]= 2.760108

#### INCARCARI SI EFORTURI

| r     | FCF   | Miyc    | Mixc    | Sigmatr                | Sigmaiy                | Sigmaix                |
|-------|-------|---------|---------|------------------------|------------------------|------------------------|
| [m]   | [daN] | [daNcm] | [daNcm] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] |
| 2.160 | 42    | 0       | 0       | 4                      | 0                      | 0                      |
| 1.980 | 85    | 113     | 13      | 6                      | 7                      | 0                      |
| 1.800 | 128   | 335     | 45      | 9                      | 16                     | 1                      |
| 1.620 | 170   | 659     | 102     | 11                     | 26                     | 1                      |
| 1.440 | 211   | 1076    | 192     | 12                     | 35                     | 2                      |
| 1.260 | 248   | 1576    | 328     | 14                     | 43                     | 3                      |
| 1.080 | 283   | 2143    | 531     | 15                     | 49                     | 4                      |
| 0.900 | 312   | 2755    | 835     | 16                     | 54                     | 6                      |
| 0.720 | 337   | 3368    | 1304    | 16                     | 57                     | 9                      |
| 0.540 | 356   | 3881    | 2072    | 17                     | 57                     | 14                     |

Evaluari ale solicitarilor la incastrare

Miaxb[Nm]= 577.774 Mitgb[Nm]= 34.18602 FCFb[N]= 3761.722

#### Rezultatele din fișierul STPALR511

REZULTATE ALE CALCULELOR STATICE PENTRU TURBINA MARGA

PROGRAM STPALR.BAS REZULTATE STPALR511

uR[m/s]= 28.8 vAM[m/s]= 9.6 v[m/s]= 8.160001 LAMB0= 3 RO[kg/m<sup>3</sup>]= 1.225

ROPAFS[kg/dm<sup>3</sup>]= 1.85

Grosimea stratului din PAFS s[mm]= 5 nr.paletelor= 3

| R[m]  | lc[mm]  | dr[-] | betinst | betinf | INC[gr] | Delint[mm] | lint[mm] | drint[-] |
|-------|---------|-------|---------|--------|---------|------------|----------|----------|
| 2.160 | 210.240 | 0.127 | 4.944   | 14.839 | 9.895   | 39.240     | 171.000  | 0.098    |
| 1.980 | 230.220 | 0.142 | 5.576   | 16.031 | 10.455  | 36.720     | 193.500  | 0.117    |

|       |         |       |        |        |        |        |         |       |
|-------|---------|-------|--------|--------|--------|--------|---------|-------|
| 1.800 | 250.200 | 0.156 | 6.333  | 17.425 | 11.091 | 34.200 | 216.000 | 0.134 |
| 1.620 | 270.180 | 0.170 | 7.259  | 19.074 | 11.815 | 31.680 | 238.500 | 0.151 |
| 1.440 | 290.160 | 0.185 | 8.417  | 21.053 | 12.636 | 29.160 | 261.000 | 0.167 |
| 1.260 | 310.140 | 0.199 | 9.905  | 23.464 | 13.559 | 26.640 | 283.500 | 0.183 |
| 1.080 | 330.120 | 0.214 | 11.889 | 26.454 | 14.565 | 24.120 | 306.000 | 0.198 |
| 0.900 | 350.100 | 0.228 | 14.667 | 30.237 | 15.570 | 21.600 | 328.500 | 0.213 |
| 0.720 | 370.080 | 0.242 | 18.833 | 35.125 | 16.292 | 19.080 | 351.000 | 0.227 |
| 0.540 | 390.060 | 0.257 | 25.778 | 41.573 | 15.795 | 16.560 | 373.500 | 0.241 |

## SINTEZE ALE CARACTERISTICILOR GEOMETRICE

| r(i) | u(i)  | Ss(i)              | Jxs(i)             | Wxs(i)             | Jys(i)             | Wys(i)             | Delmas(i) |
|------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|-----------|
| [m]  | [m/s] | [cm <sup>2</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [kg]      |
| 2.16 | 28.80 | 18.90              | 24.46              | 18.30              | 694.64             | 66.08              | 0.63      |
| 1.98 | 26.40 | 21.46              | 39.36              | 24.15              | 986.52             | 85.70              | 0.71      |
| 1.80 | 24.00 | 23.94              | 60.59              | 31.05              | 1343.62            | 107.40             | 0.80      |
| 1.62 | 21.60 | 26.33              | 89.86              | 39.04              | 1766.48            | 130.76             | 0.88      |
| 1.44 | 19.20 | 28.59              | 129.12             | 48.16              | 2252.45            | 155.26             | 0.95      |
| 1.26 | 16.80 | 30.70              | 180.49             | 58.43              | 2795.27            | 180.26             | 1.02      |
| 1.08 | 14.40 | 32.62              | 246.29             | 69.86              | 3384.52            | 205.05             | 1.09      |
| 0.90 | 12.00 | 34.32              | 328.96             | 82.42              | 4005.15            | 228.80             | 1.14      |
| 0.72 | 9.60  | 35.77              | 431.01             | 96.09              | 4636.95            | 250.59             | 1.19      |
| 0.54 | 7.20  | 36.95              | 554.97             | 110.81             | 5254.12            | 269.40             | 1.23      |

Masa totala a paletii [kg] 9.643081

## AFISAJE PENTRU FORTE

| R   | FCF   | Fy   | Fx  | Fyc  | Fxc  | Fax  | Ftg | Miax  | Mitg | MT   | PT   |
|-----|-------|------|-----|------|------|------|-----|-------|------|------|------|
| [m] | [N]   | [N]  | [N] | [N]  | [N]  | [N]  | [N] | [Nm]  | [Nm] | [Nm] | [W]  |
| 2.2 | 241.7 | 24.7 | 3.5 | 24.9 | -0.8 | 24.8 | 2.9 | 0.0   | 0.0  | 6.3  | 84.0 |
| 2.0 | 251.5 | 24.2 | 3.5 | 24.4 | -0.9 | 24.2 | 3.3 | 4.5   | 0.5  | 6.5  | 86.1 |
| 1.8 | 255.1 | 23.1 | 3.5 | 23.4 | -1.0 | 23.1 | 3.6 | 13.3  | 1.6  | 6.5  | 86.6 |
| 1.6 | 252.5 | 21.9 | 3.5 | 22.2 | -1.0 | 21.9 | 3.8 | 26.3  | 3.4  | 6.2  | 82.7 |
| 1.4 | 243.7 | 20.5 | 3.5 | 20.7 | -1.1 | 20.3 | 4.1 | 43.2  | 5.8  | 5.9  | 79.1 |
| 1.3 | 229.0 | 18.7 | 3.3 | 18.9 | -1.2 | 18.4 | 4.4 | 63.8  | 9.0  | 5.5  | 74.0 |
| 1.1 | 208.5 | 16.6 | 3.1 | 16.8 | -1.2 | 16.2 | 4.7 | 87.7  | 13.0 | 5.0  | 67.2 |
| 0.9 | 182.8 | 14.3 | 2.6 | 14.5 | -1.3 | 13.7 | 4.9 | 114.5 | 17.8 | 4.4  | 59.0 |
| 0.7 | 152.5 | 11.7 | 2.2 | 11.8 | -1.1 | 10.8 | 4.9 | 143.8 | 23.6 | 3.5  | 47.0 |
| 0.5 | 118.1 | 8.6  | 1.5 | 8.7  | -0.9 | 7.4  | 4.6 | 175.0 | 30.1 | 2.5  | 33.0 |

SumFCF[N]= 2135.603 sumMT[Nm]= 52.39233 sumPT[W]= 698.5643

Puterea la arbore pentru turbina cu z palete[kW]= 2.095693

## INCARCARI SI EFORTURI

| r     | FCF   | Miyc    | Mixc    | Sigmatr                | Sigmaiy                | Sigmaix                |
|-------|-------|---------|---------|------------------------|------------------------|------------------------|
| [m]   | [daN] | [daNcm] | [daNcm] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] |
| 2.160 | 24    | 0       | 0       | 1                      | 0                      | 0                      |
| 1.980 | 49    | 44      | 10      | 2                      | 2                      | 0                      |
| 1.800 | 75    | 132     | 31      | 3                      | 4                      | 0                      |
| 1.620 | 100   | 260     | 67      | 4                      | 7                      | 1                      |
| 1.440 | 124   | 427     | 121     | 4                      | 9                      | 1                      |
| 1.260 | 147   | 628     | 199     | 5                      | 11                     | 1                      |

|       |     |      |      |   |    |   |
|-------|-----|------|------|---|----|---|
| 1.080 | 168 | 858  | 308  | 5 | 12 | 2 |
| 0.900 | 186 | 1107 | 463  | 5 | 13 | 2 |
| 0.720 | 202 | 1361 | 687  | 6 | 14 | 3 |
| 0.540 | 214 | 1576 | 1032 | 6 | 14 | 4 |

Evaluari ale solicitărilor la incastrare

Mi<sub>ax</sub>[Nm]= 236.4852 Mit<sub>g</sub>[Nm]= 44.15426 FCF<sub>b</sub>[N]= 2335.603

### Rezultatele din fișierul STPALR512

REZULTATE ALE CALCULELOR STATICE PENTRU TURBINA MARGA

PROGRAM STPALR.BAS REZULTATE STPALR512

u<sub>R</sub>[m/s]= 38.4 v<sub>AM</sub>[m/s]= 9.6 v[m/s]= 8.160001 LAMB<sub>0</sub>= 4 RO[kg/m<sup>3</sup>]= 1.225

ROP<sub>AFS</sub>[kg/dm<sup>3</sup>]= 1.85

Grosimea stratului din PAFS s[mm]= 5 nr.palete= 3

| R[m]  | lc[mm]  | dr[-] | betinst | betinf | INC[gr] | Delint[mm] | lint[mm] | drint[-] |
|-------|---------|-------|---------|--------|---------|------------|----------|----------|
| 2.160 | 210.240 | 0.127 | 4.944   | 11.419 | 6.475   | 39.240     | 171.000  | 0.098    |
| 1.980 | 230.220 | 0.142 | 5.576   | 12.373 | 6.797   | 36.720     | 193.500  | 0.117    |
| 1.800 | 250.200 | 0.156 | 6.333   | 13.496 | 7.163   | 34.200     | 216.000  | 0.134    |
| 1.620 | 270.180 | 0.170 | 7.259   | 14.839 | 7.580   | 31.680     | 238.500  | 0.151    |
| 1.440 | 290.160 | 0.185 | 8.417   | 16.471 | 8.054   | 29.160     | 261.000  | 0.167    |
| 1.260 | 310.140 | 0.199 | 9.905   | 18.492 | 8.587   | 26.640     | 283.500  | 0.183    |
| 1.080 | 330.120 | 0.214 | 11.889  | 21.053 | 9.164   | 24.120     | 306.000  | 0.198    |
| 0.900 | 350.100 | 0.228 | 14.667  | 24.387 | 9.720   | 21.600     | 328.500  | 0.213    |
| 0.720 | 370.080 | 0.242 | 18.833  | 28.871 | 10.038  | 19.080     | 351.000  | 0.227    |
| 0.540 | 390.060 | 0.257 | 25.778  | 35.125 | 9.348   | 16.560     | 373.500  | 0.241    |

### SINTEZE ALE CARACTERISTICILOR GEOMETRICE

| r(i) | u(i)  | Ss(i)              | Jxs(i)             | Wxs(i)             | Jys(i)             | Wys(i)             | Delmas(i) |
|------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|-----------|
| [m]  | [m/s] | [cm <sup>2</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [kg]      |
| 2.16 | 38.40 | 18.90              | 24.46              | 18.30              | 694.64             | 66.08              | 0.63      |
| 1.98 | 35.20 | 21.46              | 39.36              | 24.15              | 986.52             | 85.70              | 0.71      |
| 1.80 | 32.00 | 23.94              | 60.59              | 31.05              | 1343.62            | 107.40             | 0.80      |
| 1.62 | 28.80 | 26.33              | 89.86              | 39.04              | 1766.48            | 130.76             | 0.88      |
| 1.44 | 25.60 | 28.59              | 129.12             | 48.16              | 2252.45            | 155.26             | 0.95      |
| 1.26 | 22.40 | 30.70              | 180.49             | 58.43              | 2795.27            | 180.26             | 1.02      |
| 1.08 | 19.20 | 32.62              | 246.29             | 69.86              | 3384.52            | 205.05             | 1.09      |
| 0.90 | 16.00 | 34.32              | 328.96             | 82.42              | 4005.15            | 228.80             | 1.14      |
| 0.72 | 12.80 | 35.77              | 431.01             | 96.09              | 4636.95            | 250.59             | 1.19      |
| 0.54 | 9.60  | 36.95              | 554.97             | 110.81             | 5254.12            | 269.40             | 1.23      |

Masa totala a paletei [kg] 9.643081

### AFISAJE PENTRU FORTE

| R   | FCF   | Fy   | Fx  | Fyc  | Fxc | Fax  | Ftg | Mi <sub>ax</sub> | Mit <sub>g</sub> | MT   | PT    |
|-----|-------|------|-----|------|-----|------|-----|------------------|------------------|------|-------|
| [m] | [N]   | [N]  | [N] | [N]  | [N] | [N]  | [N] | [Nm]             | [Nm]             | [Nm] | [W]   |
| 2.2 | 429.7 | 41.3 | 5.9 | 41.7 | 1.2 | 41.7 | 2.4 | 0.0              | 0.0              | 5.2  | 92.0  |
| 2.0 | 447.1 | 40.1 | 5.9 | 40.5 | 1.1 | 40.5 | 2.8 | 7.5              | 0.4              | 5.6  | 100.1 |
| 1.8 | 453.6 | 38.1 | 5.7 | 38.5 | 0.9 | 38.4 | 3.3 | 22.3             | 1.4              | 6.0  | 106.2 |
| 1.6 | 448.9 | 35.7 | 5.7 | 36.1 | 1.0 | 36.0 | 3.6 | 44.0             | 2.9              | 5.8  | 103.2 |
| 1.4 | 433.3 | 32.9 | 5.6 | 33.3 | 0.9 | 33.1 | 4.0 | 72.2             | 5.1              | 5.7  | 101.9 |
| 1.3 | 407.1 | 29.4 | 5.2 | 29.9 | 0.8 | 29.6 | 4.4 | 106.3            | 8.0              | 5.5  | 98.5  |

1.1 370.7 25.5 4.7 26.0 0.6 25.5 4.8 145.7 11.7 5.2 92.0  
 0.9 325.1 21.3 3.9 21.6 0.3 21.0 5.2 189.8 16.3 4.7 83.3  
 0.7 271.1 16.5 3.1 16.8 0.2 16.0 5.2 237.6 21.7 3.8 67.0  
 0.5 210.0 11.4 2.0 11.6 0.1 10.5 4.9 288.3 28.2 2.7 47.4  
 SumFCF[N]= 3796.627 sumMT[Nm]= 50.15678 sumPT[W]= 891.6761  
 Puterea la arbore pentru turbina cu z palete[kW]= 2.675028

#### INCARCARI SI EFORTURI

| r     | FCF   | Miyc    | Mixc    | Sigmatr                | Sigmaiy                | Sigmaix                |
|-------|-------|---------|---------|------------------------|------------------------|------------------------|
| [m]   | [daN] | [daNcm] | [daNcm] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] |
| 2.160 | 43    | 0       | 0       | 2                      | 0                      | 0                      |
| 1.980 | 88    | 75      | 12      | 4                      | 3                      | 0                      |
| 1.800 | 133   | 222     | 38      | 6                      | 7                      | 0                      |
| 1.620 | 178   | 436     | 85      | 7                      | 11                     | 1                      |
| 1.440 | 221   | 714     | 156     | 8                      | 15                     | 1                      |
| 1.260 | 262   | 1047    | 262     | 9                      | 18                     | 1                      |
| 1.080 | 299   | 1426    | 415     | 9                      | 20                     | 2                      |
| 0.900 | 332   | 1836    | 638     | 10                     | 22                     | 3                      |
| 0.720 | 359   | 2249    | 973     | 10                     | 23                     | 4                      |
| 0.540 | 380   | 2596    | 1508    | 10                     | 23                     | 6                      |

Evaluari ale solicitarilor la incastrare

MiAXB[Nm]= 387.6343 Mitgb[Nm]= 42.01774 FCFb[N]= 3996.627

#### Rezultatele din fișierul STPALR513

REZULTATE ALE CALCULELOR STATICE PENTRU TURBINA MARGA  
 PROGRAM STPALR.BAS REZULTATE STPALR513

uR[m/s]= 48 vAM[m/s]= 9.6 v[m/s]= 8.160001 LAMB0= 5 RO[kg/m<sup>3</sup>]= 1.225  
 ROPAFS[kg/dm<sup>3</sup>]= 1.85

Grosimea stratului din PAFS s[mm]= 5 nr.palete= 3

| R[m]  | lc[mm]  | dr[-] | betinst | betinf | INC[gr] | Delint[mm] | lint[mm] | drint[-] |
|-------|---------|-------|---------|--------|---------|------------|----------|----------|
| 2.160 | 210.240 | 0.127 | 4.944   | 9.269  | 4.325   | 39.240     | 171.000  | 0.098    |
| 1.980 | 230.220 | 0.142 | 5.576   | 10.059 | 4.484   | 36.720     | 193.500  | 0.117    |
| 1.800 | 250.200 | 0.156 | 6.333   | 10.995 | 4.662   | 34.200     | 216.000  | 0.134    |
| 1.620 | 270.180 | 0.170 | 7.259   | 12.120 | 4.861   | 31.680     | 238.500  | 0.151    |
| 1.440 | 290.160 | 0.185 | 8.417   | 13.496 | 5.079   | 29.160     | 261.000  | 0.167    |
| 1.260 | 310.140 | 0.199 | 9.905   | 15.217 | 5.312   | 26.640     | 283.500  | 0.183    |
| 1.080 | 330.120 | 0.214 | 11.889  | 17.425 | 5.536   | 24.120     | 306.000  | 0.198    |
| 0.900 | 350.100 | 0.228 | 14.667  | 20.351 | 5.684   | 21.600     | 328.500  | 0.213    |
| 0.720 | 370.080 | 0.242 | 18.833  | 24.387 | 5.554   | 19.080     | 351.000  | 0.227    |
| 0.540 | 390.060 | 0.257 | 25.778  | 30.237 | 4.459   | 16.560     | 373.500  | 0.241    |

#### SINTEZE ALE CARACTERISTICILOR GEOMETRICE

| r(i) | u(i)  | Ss(i)              | Jxs(i)             | Wxs(i)             | Jys(i)             | Wys(i)             | Delmas(i) |
|------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|-----------|
| [m]  | [m/s] | [cm <sup>2</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [kg]      |
| 2.16 | 48.00 | 18.90              | 24.46              | 18.30              | 694.64             | 66.08              | 0.63      |
| 1.98 | 44.00 | 21.46              | 39.36              | 24.15              | 986.52             | 85.70              | 0.71      |
| 1.80 | 40.00 | 23.94              | 60.59              | 31.05              | 1343.62            | 107.40             | 0.80      |
| 1.62 | 36.00 | 26.33              | 89.86              | 39.04              | 1766.48            | 130.76             | 0.88      |
| 1.44 | 32.00 | 28.59              | 129.12             | 48.16              | 2252.45            | 155.26             | 0.95      |
| 1.26 | 28.00 | 30.70              | 180.49             | 58.43              | 2795.27            | 180.26             | 1.02      |

|      |       |       |        |        |         |        |      |
|------|-------|-------|--------|--------|---------|--------|------|
| 1.08 | 24.00 | 32.62 | 246.29 | 69.86  | 3384.52 | 205.05 | 1.09 |
| 0.90 | 20.00 | 34.32 | 328.96 | 82.42  | 4005.15 | 228.80 | 1.14 |
| 0.72 | 16.00 | 35.77 | 431.01 | 96.09  | 4636.95 | 250.59 | 1.19 |
| 0.54 | 12.00 | 36.95 | 554.97 | 110.81 | 5254.12 | 269.40 | 1.23 |

Masa totala a paletei [kg] 9.643081

#### AFISAJE PENTRU FORTE

| R   | FCF   | Fy   | Fx  | Fyc  | Fxc | Fax  | Ftg | Miax  | Mitg | MT   | PT    |
|-----|-------|------|-----|------|-----|------|-----|-------|------|------|-------|
| [m] | [N]   | [N]  | [N] | [N]  | [N] | [N]  | [N] | [Nm]  | [Nm] | [Nm] | [W]   |
| 2.2 | 671.5 | 62.5 | 8.9 | 63.0 | 4.2 | 63.1 | 1.3 | 0.0   | 0.0  | 2.7  | 60.2  |
| 2.0 | 698.6 | 60.4 | 8.9 | 60.9 | 4.1 | 61.0 | 1.8 | 11.4  | 0.2  | 3.6  | 80.1  |
| 1.8 | 708.7 | 57.1 | 8.6 | 57.6 | 3.9 | 57.7 | 2.5 | 33.7  | 0.8  | 4.4  | 98.2  |
| 1.6 | 701.5 | 53.1 | 8.5 | 53.6 | 4.0 | 53.7 | 2.8 | 66.4  | 1.8  | 4.5  | 100.4 |
| 1.4 | 677.1 | 48.5 | 8.2 | 49.0 | 3.9 | 49.1 | 3.3 | 108.8 | 3.3  | 4.8  | 106.6 |
| 1.3 | 636.0 | 43.0 | 7.6 | 43.5 | 3.6 | 43.5 | 3.9 | 160.0 | 5.4  | 5.0  | 110.4 |
| 1.1 | 579.2 | 36.8 | 6.8 | 37.2 | 3.2 | 37.1 | 4.6 | 219.0 | 8.2  | 4.9  | 109.4 |
| 0.9 | 507.9 | 30.0 | 5.5 | 30.4 | 2.5 | 30.0 | 5.2 | 284.7 | 11.8 | 4.7  | 104.8 |
| 0.7 | 423.5 | 22.6 | 4.3 | 22.9 | 2.1 | 22.4 | 5.4 | 355.9 | 16.4 | 3.9  | 86.8  |
| 0.5 | 328.1 | 14.9 | 2.6 | 15.1 | 1.4 | 14.2 | 5.3 | 431.0 | 21.9 | 2.8  | 63.1  |

SumFCF[N]= 5932.23 sumMT[Nm]= 41.40163 sumPT[W]= 920.0361

Puterea la arbore pentru turbina cu z palete[kW]= 2.760108

#### INCARCARI SI EFORTURI

| r     | FCF   | Miyc    | Mixc    | Sigmatr                | Sigmaiy                | Sigmaix                |
|-------|-------|---------|---------|------------------------|------------------------|------------------------|
| [m]   | [daN] | [daNcm] | [daNcm] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] |
| 2.160 | 67    | 0       | 0       | 4                      | 0                      | 0                      |
| 1.980 | 137   | 113     | 13      | 6                      | 5                      | 0                      |
| 1.800 | 208   | 335     | 45      | 9                      | 11                     | 0                      |
| 1.620 | 278   | 659     | 102     | 11                     | 17                     | 1                      |
| 1.440 | 346   | 1076    | 192     | 12                     | 22                     | 1                      |
| 1.260 | 409   | 1576    | 328     | 13                     | 27                     | 2                      |
| 1.080 | 467   | 2143    | 531     | 14                     | 31                     | 3                      |
| 0.900 | 518   | 2755    | 835     | 15                     | 33                     | 4                      |
| 0.720 | 560   | 3368    | 1304    | 16                     | 35                     | 5                      |
| 0.540 | 593   | 3881    | 2072    | 16                     | 35                     | 8                      |

Evaluari ale solicitarilor la incastrare

Miaxb[Nm]= 577.774 Mitgb[Nm]= 34.18602 FCFb[N]= 6132.23

#### Rezultatele din fisierul STPALR522

REZULTATE ALE CALCULELOR STATICE PENTRU TURBINA MARGA

PROGRAM STPALR.BAS REZULTATE STPALR522

uR[m/s]= 28.8 vAM[m/s+ 11.7 v[m/s]= 9.945 LAMB0= 2.461539 RO[kg/m<sup>3</sup>]= 1.225

ROPAFS[kg/dm<sup>3</sup>]= 1.85

Grosimea stratului din PAFS s[mm]= 5 nr.palete= 3

| R[m]  | lc[mm]  | dr[-] | betinst | betinf | INC[gr] | Delint[mm] | lint[mm] | drint[-] |
|-------|---------|-------|---------|--------|---------|------------|----------|----------|
| 2.160 | 210.240 | 0.127 | 4.944   | 17.895 | 12.951  | 39.240     | 171.000  | 0.098    |
| 1.980 | 230.220 | 0.142 | 5.576   | 19.300 | 13.724  | 36.720     | 193.500  | 0.117    |
| 1.800 | 250.200 | 0.156 | 6.333   | 20.932 | 14.599  | 34.200     | 216.000  | 0.134    |
| 1.620 | 270.180 | 0.170 | 7.259   | 22.851 | 15.592  | 31.680     | 238.500  | 0.151    |
| 1.440 | 290.160 | 0.185 | 8.417   | 25.132 | 16.716  | 29.160     | 261.000  | 0.167    |
| 1.260 | 310.140 | 0.199 | 9.905   | 27.879 | 17.974  | 26.640     | 283.500  | 0.183    |
| 1.080 | 330.120 | 0.214 | 11.889  | 31.234 | 19.345  | 24.120     | 306.000  | 0.198    |

|       |         |       |        |        |        |        |         |       |
|-------|---------|-------|--------|--------|--------|--------|---------|-------|
| 0.900 | 350.100 | 0.228 | 14.667 | 35.389 | 20.723 | 21.600 | 328.500 | 0.213 |
| 0.720 | 370.080 | 0.242 | 18.833 | 40.609 | 21.775 | 19.080 | 351.000 | 0.227 |
| 0.540 | 390.060 | 0.257 | 25.778 | 47.230 | 21.452 | 16.560 | 373.500 | 0.241 |

## SINTEZE ALE CARACTERISTICILOR GEOMETRICE

| r(i) | u(i)  | Ss(i)              | Jxs(i)             | Wxs(i)             | Jys(i)             | Wys(i)             | Delmas(i) |
|------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|-----------|
| [m]  | [m/s] | [cm <sup>2</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [kg]      |
| 2.16 | 28.80 | 18.90              | 24.46              | 18.30              | 694.64             | 66.08              | 0.63      |
| 1.98 | 26.40 | 21.46              | 39.36              | 24.15              | 986.52             | 85.70              | 0.71      |
| 1.80 | 24.00 | 23.94              | 60.59              | 31.05              | 1343.62            | 107.40             | 0.80      |
| 1.62 | 21.60 | 26.33              | 89.86              | 39.04              | 1766.48            | 130.76             | 0.88      |
| 1.44 | 19.20 | 28.59              | 129.12             | 48.16              | 2252.45            | 155.26             | 0.95      |
| 1.26 | 16.80 | 30.70              | 180.49             | 58.43              | 2795.27            | 180.26             | 1.02      |
| 1.08 | 14.40 | 32.62              | 246.29             | 69.86              | 3384.52            | 205.05             | 1.09      |
| 0.90 | 12.00 | 34.32              | 328.96             | 82.42              | 4005.15            | 228.80             | 1.14      |
| 0.72 | 9.60  | 35.77              | 431.01             | 96.09              | 4636.95            | 250.59             | 1.19      |
| 0.54 | 7.20  | 36.95              | 554.97             | 110.81             | 5254.12            | 269.40             | 1.23      |

Masa totala a paletei [kg] 9.643081

## AFISAJE PENTRU FORTE

| R   | FCF   | Fy   | Fx  | Fyc  | Fxc  | Fax  | Ftg | Miay  | Mitg | MT   | PT    |
|-----|-------|------|-----|------|------|------|-----|-------|------|------|-------|
| [m] | [N]   | [N]  | [N] | [N]  | [N]  | [N]  | [N] | [Nm]  | [Nm] | [Nm] | [W]   |
| 2.2 | 241.7 | 25.5 | 3.6 | 25.7 | -2.2 | 25.4 | 4.4 | 0.0   | 0.0  | 9.4  | 125.8 |
| 2.0 | 251.5 | 25.1 | 3.7 | 25.2 | -2.4 | 24.9 | 4.8 | 4.6   | 0.8  | 9.5  | 126.9 |
| 1.8 | 255.1 | 24.2 | 3.6 | 24.3 | -2.6 | 23.9 | 5.2 | 13.6  | 2.4  | 9.4  | 125.6 |
| 1.6 | 252.5 | 23.1 | 3.7 | 23.2 | -2.6 | 22.7 | 5.5 | 26.9  | 5.0  | 9.0  | 119.5 |
| 1.4 | 243.7 | 21.8 | 3.7 | 21.9 | -2.7 | 21.3 | 5.9 | 44.4  | 8.6  | 8.5  | 113.3 |
| 1.3 | 229.0 | 20.1 | 3.6 | 20.2 | -2.8 | 19.4 | 6.3 | 65.6  | 13.3 | 7.9  | 105.1 |
| 1.1 | 208.5 | 18.2 | 3.3 | 18.3 | -2.9 | 17.3 | 6.6 | 90.4  | 19.1 | 7.1  | 94.7  |
| 0.9 | 182.8 | 16.0 | 3.0 | 16.1 | -2.9 | 14.8 | 6.9 | 118.2 | 26.0 | 6.2  | 82.6  |
| 0.7 | 152.5 | 13.5 | 2.6 | 13.5 | -2.6 | 11.9 | 6.9 | 148.7 | 34.2 | 4.9  | 65.8  |
| 0.5 | 118.1 | 10.4 | 1.8 | 10.4 | -2.1 | 8.4  | 6.4 | 181.4 | 43.7 | 3.5  | 46.2  |

SumFCF[N]= 2135.603 sumMT[Nm]= 75.42135 sumPT[W]= 1005.618

Puterea la arbore pentru turbina cu z palete[kW]= 3.016854

## INCARCARI SI EFORTURI

| r     | FCF   | Miyc    | Mixc    | Sigmatr                | Sigmaiy                | Sigmaix                |
|-------|-------|---------|---------|------------------------|------------------------|------------------------|
| [m]   | [daN] | [daNcm] | [daNcm] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] |
| 2.160 | 24    | 0       | 0       | 1                      | 0                      | 0                      |
| 1.980 | 49    | 45      | 12      | 2                      | 2                      | 0                      |
| 1.800 | 75    | 135     | 39      | 3                      | 4                      | 0                      |
| 1.620 | 100   | 267     | 84      | 4                      | 7                      | 1                      |
| 1.440 | 124   | 439     | 150     | 4                      | 9                      | 1                      |
| 1.260 | 147   | 646     | 244     | 5                      | 11                     | 1                      |
| 1.080 | 168   | 884     | 373     | 5                      | 13                     | 2                      |
| 0.900 | 186   | 1144    | 551     | 5                      | 14                     | 2                      |
| 0.720 | 202   | 1408    | 804     | 6                      | 15                     | 3                      |
| 0.540 | 214   | 1634    | 1182    | 6                      | 15                     | 4                      |

Evaluari ale solicitarilor la incastare

Miay[Nm]= 245.9984 Mitg[Nm]= 63.65505 FCFb[N]= 2335.603

## Rezultatele din fișierul STPALR521

## REZULTATE ALE CALCULELOR STATICE PENTRU TURBINA MARGA



## PROGRAM STPALR.BAS    REZULTATE STPALR521

uR[m/s]= 38.4    vAM[m/s]= 11.7    v[m/s]= 9.945    LAMB0= 3.282052    RO[kg/m<sup>3</sup>]= 1.225  
 ROPAFS[kg/dm<sup>3</sup>]= 1.85

Grosimea stratului din PAFS s[mm]= 5    nr.palete= 3

| R[m]  | lc[mm]  | dr[-] | betinst | betinf | INC[gr] | Delint[mm] | lint[mm] | drint[-] |
|-------|---------|-------|---------|--------|---------|------------|----------|----------|
| 2.160 | 210.240 | 0.127 | 4.944   | 13.830 | 8.885   | 39.240     | 171.000  | 0.098    |
| 1.980 | 230.220 | 0.142 | 5.576   | 14.968 | 9.392   | 36.720     | 193.500  | 0.117    |
| 1.800 | 250.200 | 0.156 | 6.333   | 16.305 | 9.971   | 34.200     | 216.000  | 0.134    |
| 1.620 | 270.180 | 0.170 | 7.259   | 17.895 | 10.636  | 31.680     | 238.500  | 0.151    |
| 1.440 | 290.160 | 0.185 | 8.417   | 19.816 | 11.399  | 29.160     | 261.000  | 0.167    |
| 1.260 | 310.140 | 0.199 | 9.905   | 22.176 | 12.271  | 26.640     | 283.500  | 0.183    |
| 1.080 | 330.120 | 0.214 | 11.889  | 25.132 | 13.243  | 24.120     | 306.000  | 0.198    |
| 0.900 | 350.100 | 0.228 | 14.667  | 28.922 | 14.255  | 21.600     | 328.500  | 0.213    |
| 0.720 | 370.080 | 0.242 | 18.833  | 33.900 | 15.067  | 19.080     | 351.000  | 0.227    |
| 0.540 | 390.060 | 0.257 | 25.778  | 40.609 | 14.831  | 16.560     | 373.500  | 0.241    |

## SINTEZE ALE CARACTERISTICILOR GEOMETRICE

| r(i) | u(i)  | Ss(i)              | Jxs(i)             | Wxs(i)             | Jys(i)             | Wys(i)             | Delmas(i) |
|------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|-----------|
| [m]  | [m/s] | [cm <sup>2</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [kg]      |
| 2.16 | 38.40 | 18.90              | 24.46              | 18.30              | 694.64             | 66.08              | 0.63      |
| 1.98 | 35.20 | 21.46              | 39.36              | 24.15              | 986.52             | 85.70              | 0.71      |
| 1.80 | 32.00 | 23.94              | 60.59              | 31.05              | 1343.62            | 107.40             | 0.80      |
| 1.62 | 28.80 | 26.33              | 89.86              | 39.04              | 1766.48            | 130.76             | 0.88      |
| 1.44 | 25.60 | 28.59              | 129.12             | 48.16              | 2252.45            | 155.26             | 0.95      |
| 1.26 | 22.40 | 30.70              | 180.49             | 58.43              | 2795.27            | 180.26             | 1.02      |
| 1.08 | 19.20 | 32.62              | 246.29             | 69.86              | 3384.52            | 205.05             | 1.09      |
| 0.90 | 16.00 | 34.32              | 328.96             | 82.42              | 4005.15            | 228.80             | 1.14      |
| 0.72 | 12.80 | 35.77              | 431.01             | 96.09              | 4636.95            | 250.59             | 1.19      |
| 0.54 | 9.60  | 36.95              | 554.97             | 110.81             | 5254.12            | 269.40             | 1.23      |

Masa totala a paletelor [kg] 9.643081

## AFISAJE PENTRU FORTE

| R   | FCF   | Fy   | Fx  | Fyc  | Fxc  | Fax  | Ftg | Miax  | Mitg | MT   | PT    |
|-----|-------|------|-----|------|------|------|-----|-------|------|------|-------|
| [m] | [N]   | [N]  | [N] | [N]  | [N]  | [N]  | [N] | [Nm]  | [Nm] | [Nm] | [W]   |
| 2.2 | 429.7 | 42.1 | 6.0 | 42.6 | -0.6 | 42.3 | 4.2 | 0.0   | 0.0  | 9.1  | 162.3 |
| 2.0 | 447.1 | 41.0 | 6.0 | 41.5 | -0.8 | 41.2 | 4.8 | 7.6   | 0.8  | 9.5  | 168.2 |
| 1.8 | 453.6 | 39.1 | 5.9 | 39.5 | -1.0 | 39.2 | 5.3 | 22.7  | 2.4  | 9.6  | 170.7 |
| 1.6 | 448.9 | 36.8 | 5.9 | 37.3 | -1.0 | 36.9 | 5.7 | 44.7  | 5.0  | 9.2  | 163.3 |
| 1.4 | 433.3 | 34.1 | 5.8 | 34.6 | -1.1 | 34.1 | 6.1 | 73.5  | 8.6  | 8.8  | 157.0 |
| 1.3 | 407.1 | 30.9 | 5.5 | 31.3 | -1.2 | 30.6 | 6.6 | 108.3 | 13.3 | 8.3  | 147.7 |
| 1.1 | 370.7 | 27.1 | 5.0 | 27.6 | -1.4 | 26.7 | 7.0 | 148.7 | 19.2 | 7.6  | 134.6 |
| 0.9 | 325.1 | 23.0 | 4.2 | 23.4 | -1.6 | 22.2 | 7.4 | 193.9 | 26.3 | 6.7  | 118.7 |
| 0.7 | 271.1 | 18.4 | 3.5 | 18.7 | -1.4 | 17.2 | 7.4 | 243.1 | 34.8 | 5.3  | 94.3  |
| 0.5 | 210.0 | 13.3 | 2.3 | 13.4 | -1.2 | 11.6 | 6.9 | 295.3 | 44.6 | 3.7  | 66.0  |

SumFCF[N]= 3796.627    sumMT[Nm]= 77.77473    sumPT[W]= 1382.662

Puterea la arbore pentru turbina cu z palete[kW]= 4.147985

## INCARCARI SI EFORTURI

| r     | FCF   | Miyc    | Mixc    | Sigmatr                | Sigmaiy                | Sigmaix                |
|-------|-------|---------|---------|------------------------|------------------------|------------------------|
| [m]   | [daN] | [daNcm] | [daNcm] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] |
| 2.160 | 43    | 0       | 0       | 2                      | 0                      | 0                      |
| 1.980 | 88    | 76      | 15      | 4                      | 3                      | 0                      |
| 1.800 | 133   | 225     | 49      | 6                      | 7                      | 0                      |

|       |     |      |      |    |    |   |
|-------|-----|------|------|----|----|---|
| 1.620 | 178 | 444  | 106  | 7  | 11 | 1 |
| 1.440 | 221 | 727  | 192  | 8  | 15 | 1 |
| 1.260 | 262 | 1067 | 317  | 9  | 18 | 2 |
| 1.080 | 299 | 1455 | 494  | 9  | 21 | 2 |
| 0.900 | 332 | 1876 | 745  | 10 | 23 | 3 |
| 0.720 | 359 | 2301 | 1114 | 10 | 24 | 4 |
| 0.540 | 380 | 2660 | 1686 | 10 | 24 | 6 |

Evaluari ale sollicitarilor la incastrare

MiAXB[Nm]= 398.0262 Mitgb[Nm]= 65.49482 FCFb[N]= 3996.627

### Rezultatele din fișierul STPALR523

REZULTATE ALE CALCULELOR STATICE PENTRU TURBINA MARGA

PROGRAM STPALR.BAS REZULTATE STPALR523

uR[m/s]= 48 vAM[m/s+ 11.7 v[m/s]= 9.945 LAMB0= 4.102564 RO[kg/m<sup>3</sup>]= 1.225

ROPAFS[kg/dm<sup>3</sup>]= 1.85

Grosimea stratului din PAFS s[mm]= 5 nr.palete= 3

| R[m]  | lc[mm]  | dr[-] | betinst | betinf | INC[gr] | Delint[mm] | lint[mm] | drint[-] |
|-------|---------|-------|---------|--------|---------|------------|----------|----------|
| 2.160 | 210.240 | 0.127 | 4.944   | 11.250 | 6.305   | 39.240     | 171.000  | 0.098    |
| 1.980 | 230.220 | 0.142 | 5.576   | 12.200 | 6.624   | 36.720     | 193.500  | 0.117    |
| 1.800 | 250.200 | 0.156 | 6.333   | 13.322 | 6.989   | 34.200     | 216.000  | 0.134    |
| 1.620 | 270.180 | 0.170 | 7.259   | 14.666 | 7.407   | 31.680     | 238.500  | 0.151    |
| 1.440 | 290.160 | 0.185 | 8.417   | 16.305 | 7.888   | 29.160     | 261.000  | 0.167    |
| 1.260 | 310.140 | 0.199 | 9.905   | 18.341 | 8.436   | 26.640     | 283.500  | 0.183    |
| 1.080 | 330.120 | 0.214 | 11.889  | 20.932 | 9.044   | 24.120     | 306.000  | 0.198    |
| 0.900 | 350.100 | 0.228 | 14.667  | 24.326 | 9.659   | 21.600     | 328.500  | 0.213    |
| 0.720 | 370.080 | 0.242 | 18.833  | 28.922 | 10.088  | 19.080     | 351.000  | 0.227    |
| 0.540 | 390.060 | 0.257 | 25.778  | 35.389 | 9.612   | 16.560     | 373.500  | 0.241    |

### SINTEZE ALE CARACTERISTICILOR GEOMETRICE

| r(i) | u(i)  | Ss(i)              | Jxs(i)             | Wxs(i)             | Jys(i)             | Wys(i)             | Delmas(i) |
|------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|-----------|
| [m]  | [m/s] | [cm <sup>2</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [cm <sup>4</sup> ] | [cm <sup>3</sup> ] | [kg]      |
| 2.16 | 48.00 | 18.90              | 24.46              | 18.30              | 694.64             | 66.08              | 0.63      |
| 1.98 | 44.00 | 21.46              | 39.36              | 24.15              | 986.52             | 85.70              | 0.71      |
| 1.80 | 40.00 | 23.94              | 60.59              | 31.05              | 1343.62            | 107.40             | 0.80      |
| 1.62 | 36.00 | 26.33              | 89.86              | 39.04              | 1766.48            | 130.76             | 0.88      |
| 1.44 | 32.00 | 28.59              | 129.12             | 48.16              | 2252.45            | 155.26             | 0.95      |
| 1.26 | 28.00 | 30.70              | 180.49             | 58.43              | 2795.27            | 180.26             | 1.02      |
| 1.08 | 24.00 | 32.62              | 246.29             | 69.86              | 3384.52            | 205.05             | 1.09      |
| 0.90 | 20.00 | 34.32              | 328.96             | 82.42              | 4005.15            | 228.80             | 1.14      |
| 0.72 | 16.00 | 35.77              | 431.01             | 96.09              | 4636.95            | 250.59             | 1.19      |
| 0.54 | 12.00 | 36.95              | 554.97             | 110.81             | 5254.12            | 269.40             | 1.23      |

Masa totala a paletei [kg] 9.643081

### AFISAJE PENTRU FORTE

| R   | FCF   | Fy   | Fx  | Fyc  | Fxc | Fax  | Ftg | MiAx  | Mitg | MT   | PT    |
|-----|-------|------|-----|------|-----|------|-----|-------|------|------|-------|
| [m] | [N]   | [N]  | [N] | [N]  | [N] | [N]  | [N] | [Nm]  | [Nm] | [Nm] | [W]   |
| 2.2 | 671.5 | 63.3 | 9.0 | 63.9 | 2.0 | 63.8 | 3.5 | 0.0   | 0.0  | 7.5  | 166.9 |
| 2.0 | 698.6 | 61.3 | 9.0 | 61.9 | 1.9 | 61.8 | 4.2 | 11.5  | 0.6  | 8.2  | 182.9 |
| 1.8 | 708.7 | 58.1 | 8.7 | 58.7 | 1.6 | 58.5 | 4.9 | 34.1  | 2.0  | 8.8  | 195.2 |
| 1.6 | 701.5 | 54.2 | 8.7 | 54.9 | 1.7 | 54.7 | 5.3 | 67.2  | 4.3  | 8.6  | 190.2 |
| 1.4 | 677.1 | 49.8 | 8.4 | 50.5 | 1.5 | 50.1 | 5.9 | 110.2 | 7.5  | 8.5  | 188.3 |
| 1.3 | 636.0 | 44.4 | 7.9 | 45.1 | 1.3 | 44.6 | 6.5 | 162.2 | 11.7 | 8.2  | 182.4 |

|     |       |      |     |      |     |      |     |       |      |     |       |
|-----|-------|------|-----|------|-----|------|-----|-------|------|-----|-------|
| 1.1 | 579.2 | 38.4 | 7.1 | 39.0 | 0.9 | 38.3 | 7.1 | 222.3 | 17.2 | 7.7 | 170.8 |
| 0.9 | 507.9 | 31.7 | 5.8 | 32.3 | 0.4 | 31.3 | 7.7 | 289.2 | 23.9 | 7.0 | 154.7 |
| 0.7 | 423.5 | 24.5 | 4.7 | 24.9 | 0.3 | 23.7 | 7.8 | 361.8 | 32.0 | 5.6 | 124.3 |
| 0.5 | 328.1 | 16.7 | 2.9 | 17.0 | 0.1 | 15.3 | 7.3 | 438.6 | 41.5 | 4.0 | 87.8  |

SumFCF[N]= 5932.23 sumMT[Nm]= 73.9585 sumPT[W]= 1643.522

Puterea la arbore pentru turbina cu z palete[kW]= 4.930566

INCARCARI SI EFORTURI

| r     | FCF   | Miyc    | Mixc    | Sigmatr                | Sigmaiy                | Sigmaix                |
|-------|-------|---------|---------|------------------------|------------------------|------------------------|
| [m]   | [daN] | [daNcm] | [daNcm] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] | [daN/cm <sup>2</sup> ] |
| 2.160 | 67    | 0       | 0       | 4                      | 0                      | 0                      |
| 1.980 | 137   | 114     | 17      | 6                      | 5                      | 0                      |
| 1.800 | 208   | 339     | 57      | 9                      | 11                     | 1                      |
| 1.620 | 278   | 667     | 127     | 11                     | 17                     | 1                      |
| 1.440 | 346   | 1090    | 235     | 12                     | 23                     | 2                      |
| 1.260 | 409   | 1598    | 394     | 13                     | 27                     | 2                      |
| 1.080 | 467   | 2175    | 626     | 14                     | 31                     | 3                      |
| 0.900 | 518   | 2798    | 963     | 15                     | 34                     | 4                      |
| 0.720 | 560   | 3424    | 1471    | 16                     | 36                     | 6                      |
| 0.540 | 593   | 3950    | 2281    | 16                     | 36                     | 8                      |

Evaluari ale solicitarilor la incastrare

MiAXB[Nm]= 588.9867 Mitgb[Nm]= 61.93121 FCFb[N]= 6132.23

## 3.8. Programul GENEMTH1

### 3.8.1. Programul GENEMTH1.BAS

```

REM Program pentru turbina orizontala Marga
REM varianta de salvare a rezultatelor printr-un fisier n$
REM intocmit la 04.6.2008
50 INPUT "pasn="; pasn
PRINT "n$=GEMTH1j;j nr de ordine"
INPUT "enter filename"; n$
PRINT "confirmare n$="; n$
OPEN n$ FOR OUTPUT AS #1
CLS
PRINT #1, "REZULTATELE RANDAMENTELOR PENTRU TURATII SI CURENTI DIFERITI"
PRINT #1, "fisier :"; n$
PRINT #1, "*****"
PRINT "TURATIA n[rpm]: "; n
PRINT
PRINT "*****"
LET om = n / 30 * 3.1415
PRINT #1, "n[rpm] I[A] --> 1      2      3      4      5      6      7      8      9
10    11    "
PRINT #1,
PRINT "*****"
FOR n = 10 TO 300 STEP pasn
PRINT #1, '
PRINT #1, n; "      ";
om = n / 30 * 3.1415
DIM A(11)
DIM Uf(11)
DIM Pel(11)
DIM Ri(11)

```

```
DIM Ppe1(11)
DIM Ppe2(11)
DIM Ppl(11)
DIM Pme(11)
DIM Pptot(11)
DIM randel(11)
DIM Mem(11)
FOR i = 1 TO 11
LET A(i) = i
LET k1 = 1.78 - .008 * i ^ 2
LET Uf(i) = k1 * n
LET Pel(i) = 3 * Uf(i) * i
LET Ri = 15.33
LET Ppe1(i) = Ri * i ^ 2
REM Ri nu corespunde cu valoarea rezistentei masurate;a rezultat statistic din
masuraturi de performante
LET Ppe2(i) = .11 * n ^ 1.3
LET Ppl(i) = .51 * n
LET Pme(i) = Ppe1(i) + Ppe2(i) + Pel(i) + Ppl(i)
LET Pptot(i) = Ppe1(i) + Ppe2(i) + Ppl(i)
LET randel(i) = Pel(i) / Pme(i)
LET Mem(i) = Pme(i) / om
NEXT i
PRINT "Uf[V] ";
FOR i = 1 TO 11
PRINT USING " ###.#"; Uf(i);
NEXT i
PRINT "U1[V] ";
FOR i = 1 TO 11
PRINT USING " ###.#"; SQR(3) * Uf(i);
NEXT i
PRINT "Pel[W] ";
FOR i = 1 TO 11
PRINT USING " #### "; Pel(i);
NEXT i
PRINT "Ri[om] ";
FOR i = 1 TO 11
PRINT USING " ###.#"; Ri(i);
NEXT i
PRINT "Pptot ";
FOR i = 1 TO 11
PRINT USING " ###.#"; Pptot(i);
NEXT i
PRINT "Pmec [W] ";
FOR i = 1 TO 11
PRINT USING " #### "; Pme(i);
NEXT i
PRINT "Randel[%]";
FOR i = 1 TO 11
PRINT #1, USING " ###.#"; 100 * randel(i);
NEXT i
PRINT "Mem [Nm] ";
FOR i = 1 TO 11
PRINT USING " ###.#"; Mem(i);
NEXT i
PRINT ' ' ' ' ' ' ' '
CLS
NEXT n
INPUT "optiuni x=1 END,alt caracter :continuare ?"; x
IF x = 1 THEN END
GOTO 50
```

### 3.8.2. Rezultatele programului GENEMTH1.BAS

#### Fișierul cu rezultate GEMTH11

REZULTATELE RANDAMENTELOR PENTRU TURATII SI CURENTI DIFERITI

fișier :GEMTH11

```
*****
n[rpm] I[A] --> 1      2      3      4      5      6      7      8      9      10     11
*****
```

|     |      |      |      |      |      |      |      |      |      |      |      |
|-----|------|------|------|------|------|------|------|------|------|------|------|
| 10  | 70.1 | 60.5 | 51.4 | 44.0 | 37.8 | 32.4 | 27.8 | 23.5 | 19.7 | 16.0 | 12.6 |
| 20  | 77.5 | 73.2 | 66.7 | 60.3 | 54.3 | 48.6 | 43.2 | 37.9 | 32.7 | 27.5 | 22.3 |
| 30  | 80.0 | 78.6 | 74.0 | 68.8 | 63.6 | 58.3 | 53.0 | 47.6 | 42.0 | 36.2 | 30.0 |
| 40  | 81.3 | 81.5 | 78.2 | 74.0 | 69.5 | 64.7 | 59.8 | 54.5 | 48.9 | 42.9 | 36.2 |
| 50  | 81.9 | 83.4 | 80.9 | 77.5 | 73.5 | 69.3 | 64.7 | 59.8 | 54.3 | 48.3 | 41.4 |
| 60  | 82.3 | 84.6 | 82.8 | 79.9 | 76.5 | 72.7 | 68.5 | 63.8 | 58.6 | 52.7 | 45.7 |
| 70  | 82.6 | 85.5 | 84.2 | 81.8 | 78.8 | 75.3 | 71.5 | 67.1 | 62.1 | 56.3 | 49.4 |
| 80  | 82.7 | 86.2 | 85.3 | 83.3 | 80.6 | 77.5 | 73.9 | 69.8 | 65.0 | 59.4 | 52.6 |
| 90  | 82.8 | 86.7 | 86.2 | 84.4 | 82.0 | 79.2 | 75.8 | 72.0 | 67.5 | 62.1 | 55.4 |
| 100 | 82.8 | 87.0 | 86.8 | 85.4 | 83.2 | 80.6 | 77.5 | 73.9 | 69.6 | 64.4 | 57.9 |
| 110 | 82.9 | 87.4 | 87.4 | 86.1 | 84.2 | 81.8 | 78.9 | 75.5 | 71.4 | 66.4 | 60.1 |
| 120 | 82.9 | 87.6 | 87.9 | 86.8 | 85.0 | 82.8 | 80.1 | 76.9 | 73.0 | 68.1 | 62.0 |
| 130 | 82.8 | 87.8 | 88.3 | 87.4 | 85.8 | 83.7 | 81.2 | 78.1 | 74.4 | 69.7 | 63.7 |
| 140 | 82.8 | 88.0 | 88.6 | 87.8 | 86.4 | 84.5 | 82.1 | 79.2 | 75.6 | 71.1 | 65.3 |
| 150 | 82.8 | 88.1 | 88.9 | 88.2 | 86.9 | 85.1 | 82.9 | 80.1 | 76.7 | 72.4 | 66.7 |
| 160 | 82.7 | 88.2 | 89.1 | 88.6 | 87.4 | 85.7 | 83.6 | 81.0 | 77.7 | 73.5 | 68.0 |
| 170 | 82.7 | 88.3 | 89.3 | 88.9 | 87.8 | 86.3 | 84.3 | 81.7 | 78.6 | 74.5 | 69.2 |
| 180 | 82.6 | 88.4 | 89.5 | 89.2 | 88.2 | 86.8 | 84.8 | 82.4 | 79.4 | 75.5 | 70.3 |
| 190 | 82.6 | 88.5 | 89.7 | 89.5 | 88.6 | 87.2 | 85.4 | 83.1 | 80.1 | 76.3 | 71.3 |
| 200 | 82.5 | 88.6 | 89.8 | 89.7 | 88.9 | 87.6 | 85.8 | 83.6 | 80.8 | 77.1 | 72.2 |
| 210 | 82.5 | 88.6 | 90.0 | 89.9 | 89.2 | 87.9 | 86.3 | 84.2 | 81.4 | 77.9 | 73.0 |
| 220 | 82.4 | 88.6 | 90.1 | 90.1 | 89.4 | 88.3 | 86.7 | 84.6 | 82.0 | 78.5 | 73.8 |
| 230 | 82.4 | 88.7 | 90.2 | 90.3 | 89.6 | 88.6 | 87.0 | 85.1 | 82.5 | 79.2 | 74.6 |
| 240 | 82.3 | 88.7 | 90.3 | 90.4 | 89.9 | 88.8 | 87.4 | 85.5 | 83.0 | 79.7 | 75.3 |
| 250 | 82.2 | 88.7 | 90.4 | 90.6 | 90.0 | 89.1 | 87.7 | 85.9 | 83.5 | 80.3 | 75.9 |
| 260 | 82.2 | 88.8 | 90.4 | 90.7 | 90.2 | 89.3 | 88.0 | 86.2 | 83.9 | 80.8 | 76.5 |
| 270 | 82.1 | 88.8 | 90.5 | 90.8 | 90.4 | 89.5 | 88.2 | 86.5 | 84.3 | 81.3 | 77.1 |
| 280 | 82.1 | 88.8 | 90.6 | 90.9 | 90.5 | 89.7 | 88.5 | 86.8 | 84.7 | 81.7 | 77.6 |
| 290 | 82.0 | 88.8 | 90.6 | 91.0 | 90.7 | 89.9 | 88.7 | 87.1 | 85.0 | 82.1 | 78.1 |
| 300 | 82.0 | 88.8 | 90.7 | 91.1 | 90.8 | 90.1 | 88.9 | 87.4 | 85.3 | 82.5 | 78.6 |

### 3.9. Programul PU-UF

#### 3.9.1. Programul PU-UF.BAS

```
REM programul "Pu-Uf" este intocmit pentru conducerea grupului de masini
REM constantele modelului :lamb0;S;R;ro;a;b;c;d;f
CLS
INPUT "LAMB0="; LAMB0
INPUT "RO="; Ro
S = 15.9: R = 2.25: a = 1.78: b = .045: c = 15.33: d = .11: f = .51
REM Ecuatia Ka*Pu^2+Kb*Pu+Kc=0
INPUT "imax"; imax
DIM Uf(imax)
DIM Pu(imax)
DIM Pa(imax)
```

```

DIM Paa(imax)
DIM i(imax)
DIM Pp1(imax)
DIM Pp2(imax)
DIM Pp3(imax)
DIM n(imax)
DIM v(imax)
DIM Ka(imax)
DIM Kb(imax)
DIM Kc(imax)
DIM k1(imax)
PI = 3.1415
CPmax = .3 * LAMB0 ^ .35 - .0014 * LAMB0 ^ 2
FOR i = 1 TO imax
  ia = 5
  Uf(i) = 10 * i + 40
  10 k1(i) = a - b * ia
  Ka(i) = c / 9 / Uf(i) ^ 2
  Kb(i) = 1
  Kc(i) = d * (Uf(i) / k1(i)) ^ 1.3 + f * Uf(i) / k1(i) - CPmax * Ro / 2 * S *
  (PI / 30 * R / LAMB0) ^ 3 * (Uf(i) / k1(i)) ^ 3
  Pu(i) = (-1 + SQR(1 - 4 * Ka(i) * Kc(i))) / 2 / Ka(i)
  i(i) = Pu(i) / 3 / Uf(i)
  Difi = ABS(ia - i(i))
  IF Difi > .01 THEN LET ia = i(i): GOTO 10
  n(i) = Uf(i) / k1(i)
  v(i) = PI * n(i) / 30 * R / LAMB0
  Pp1(i) = c * i(i) ^ 2
  Pp2(i) = d * n(i) ^ 1.3
  Pp3(i) = f * n(i)
  Pa(i) = Pu(i) + Pp1(i) + Pp2(i) + Pp3(i)
  Paa(i) = CPmax * Ro / 2 * S * v(i) ^ 3
  PRINT Difi
  REM INPUT "cont"; cont
  IF Pu(i) > 4500 THEN GOTO 100
NEXT i
100 CLS
PRINT "PROGRAM PENTRU CONDUCEREA AGREGATULUI MARGA "
PRINT "PU-UF.BAS"
PRINT "      REZULTATE PENTRU GRUPUL DE MASINI (TURBINA+GENERATOR)"
PRINT
"*****"
PRINT "CONSTANTE:"
PRINT " LAMB0 RO[kg/m3] S[m2] R[m] a b c d f"
PRINT USING " ##.###"; LAMB0; Ro; S; R; a; b; c; d; f
PRINT
"*****"
PRINT " Uf[V] Pu[W] Pa[W] Paa[W] Pp1[W] Pp2[W] Pp3[W] n[rpm]
v[m/s] i[A]"
PRINT
"*****"
"
FOR i = 1 TO imax
PRINT USING "####.## "; Uf(i); Pu(i); Pa(i); Paa(i); Pp1(i); Pp2(i); Pp3(i);
n(i); v(i); i(i)
IF Pu(i) > 4500 THEN END
NEXT i
END

```

### 3.9.2. Analiza cazurilor

| Fișierul | $\lambda_0$ [-] | $\rho$ [kg/m <sup>3</sup> ] |
|----------|-----------------|-----------------------------|
| PU-UF1   | 3               | 1                           |
| PU-UF2   | 3               | 1,225                       |
| PU-UF3   | 3               | 1,5                         |
| PU-UF4   | 4               | 1                           |
| PU-UF5   | 4               | 1,225                       |
| PU-UF6   | 4               | 1,5                         |

### 3.9.3. Rezultatele programului PU-UF.BAS

#### Fișierul cu rezultate PU-UF1

PROGRAM PENTRU CONDUCEREA AGREGATULUI MARGA  
PU-UF.BAS

REZULTATE PENTRU GRUPUL DE MASINI (TURBINA+GENERATOR)

\*\*\*\*\*

CONSTANTE:

LAMB0 RO[kg/m3] S[m2] R[m] a b c d f  
3.000 1.000 15.900 2.250 1.780 0.045 15.330 0.110 0.510

\*\*\*\*\*

| Uf [V] | Pu [W]  | Pa [W]  | Paa [W] | Pp1 [W] | Pp2 [W] | Pp3 [W] | n [rpm] | v [m/s] | i [A] |
|--------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| 50.00  | 13.88   | 36.80   | 36.80   | 0.13    | 8.43    | 14.36   | 28.16   | 2.21    | 0.09  |
| 60.00  | 35.51   | 64.11   | 64.11   | 0.60    | 10.72   | 17.28   | 33.88   | 2.66    | 0.20  |
| 70.00  | 67.83   | 102.81  | 102.81  | 1.60    | 13.16   | 20.22   | 39.66   | 3.11    | 0.32  |
| 80.00  | 112.83  | 155.14  | 155.14  | 3.39    | 15.73   | 23.20   | 45.48   | 3.57    | 0.47  |
| 90.00  | 172.88  | 223.81  | 223.81  | 6.28    | 18.43   | 26.21   | 51.39   | 4.04    | 0.64  |
| 100.00 | 250.44  | 311.67  | 311.67  | 10.68   | 21.28   | 29.27   | 57.39   | 4.51    | 0.83  |
| 110.00 | 348.33  | 422.06  | 422.06  | 17.08   | 24.26   | 32.38   | 63.50   | 4.99    | 1.06  |
| 120.00 | 469.75  | 558.81  | 558.81  | 26.10   | 27.40   | 35.56   | 69.72   | 5.48    | 1.30  |
| 130.00 | 618.45  | 726.51  | 726.51  | 38.55   | 30.70   | 38.81   | 76.10   | 5.98    | 1.59  |
| 140.00 | 798.24  | 929.93  | 929.93  | 55.38   | 34.17   | 42.14   | 82.63   | 6.49    | 1.90  |
| 150.00 | 1015.45 | 1176.93 | 1176.93 | 78.06   | 37.84   | 45.58   | 89.37   | 7.02    | 2.26  |
| 160.00 | 1276.52 | 1475.83 | 1475.83 | 108.42  | 41.74   | 49.15   | 96.38   | 7.57    | 2.66  |
| 170.00 | 1590.34 | 1838.20 | 1838.20 | 149.07  | 45.91   | 52.88   | 103.70  | 8.14    | 3.12  |
| 180.00 | 1968.96 | 2279.99 | 2279.99 | 203.81  | 50.40   | 56.82   | 111.41  | 8.75    | 3.65  |
| 190.00 | 2429.45 | 2824.26 | 2824.26 | 278.49  | 55.30   | 61.02   | 119.65  | 9.40    | 4.26  |
| 200.00 | 2998.43 | 3507.62 | 3507.62 | 382.85  | 60.74   | 65.59   | 128.62  | 10.10   | 5.00  |
| 210.00 | 3723.97 | 4397.33 | 4397.33 | 535.64  | 66.99   | 70.73   | 138.68  | 10.89   | 5.91  |
| 220.00 | 4725.11 | 5662.55 | 5662.55 | 785.74  | 74.75   | 76.95   | 150.88  | 11.85   | 7.16  |

#### Fișierul cu rezultate PU-UF2

PROGRAM PENTRU CONDUCEREA AGREGATULUI MARGA  
PU-UF.BAS

REZULTATE PENTRU GRUPUL DE MASINI (TURBINA+GENERATOR)

\*\*\*\*\*

CONSTANTE:

LAMB0 RO[kg/m3] S[m2] R[m] a b c d f  
3.000 1.225 15.900 2.250 1.780 0.045 15.330 0.110 0.510

\*\*\*\*\*

| Uf [V] | Pu [W] | Pa [W] | Paa [W] | Pp1 [W] | Pp2 [W] | Pp3 [W] | n [rpm] | v [m/s] | i [A] |
|--------|--------|--------|---------|---------|---------|---------|---------|---------|-------|
| 50.00  | 22.11  | 45.27  | 45.27   | 0.33    | 8.45    | 14.38   | 28.20   | 2.21    | 0.15  |

|        |         |         |         |         |       |       |        |       |      |
|--------|---------|---------|---------|---------|-------|-------|--------|-------|------|
| 60.00  | 49.78   | 79.02   | 79.02   | 1.17    | 10.75 | 17.31 | 33.95  | 2.67  | 0.28 |
| 70.00  | 90.67   | 127.02  | 127.02  | 2.86    | 13.21 | 20.28 | 39.77  | 3.12  | 0.43 |
| 80.00  | 147.30  | 192.16  | 192.16  | 5.77    | 15.80 | 23.28 | 45.65  | 3.59  | 0.61 |
| 90.00  | 222.80  | 278.12  | 278.12  | 10.44   | 18.55 | 26.34 | 51.64  | 4.06  | 0.83 |
| 100.00 | 320.44  | 388.83  | 388.83  | 17.49   | 21.45 | 29.45 | 57.74  | 4.54  | 1.07 |
| 110.00 | 444.08  | 528.97  | 528.97  | 27.76   | 24.51 | 32.63 | 63.98  | 5.03  | 1.35 |
| 120.00 | 598.28  | 704.25  | 704.25  | 42.34   | 27.74 | 35.90 | 70.39  | 5.53  | 1.66 |
| 130.00 | 787.86  | 920.84  | 920.84  | 62.56   | 31.16 | 39.25 | 76.97  | 6.04  | 2.02 |
| 140.00 | 1020.68 | 1188.76 | 1188.76 | 90.54   | 34.81 | 42.74 | 83.81  | 6.58  | 2.43 |
| 150.00 | 1305.28 | 1519.36 | 1519.36 | 128.98  | 38.71 | 46.38 | 90.95  | 7.14  | 2.90 |
| 160.00 | 1653.82 | 1928.96 | 1928.96 | 181.99  | 42.93 | 50.23 | 98.48  | 7.73  | 3.45 |
| 170.00 | 2083.59 | 2441.34 | 2441.34 | 255.87  | 47.54 | 54.33 | 106.53 | 8.37  | 4.09 |
| 180.00 | 2621.88 | 3094.76 | 3094.76 | 361.39  | 52.69 | 58.80 | 115.29 | 9.05  | 4.86 |
| 190.00 | 3313.15 | 3953.48 | 3953.48 | 517.94  | 58.59 | 63.80 | 125.10 | 9.82  | 5.81 |
| 200.00 | 4282.74 | 5199.67 | 5199.67 | 781.06  | 65.97 | 69.90 | 137.06 | 10.76 | 7.14 |
| 210.00 | 6086.76 | 7675.43 | 7675.43 | 1430.98 | 78.10 | 79.59 | 156.06 | 12.26 | 9.66 |

### Fișierul cu rezultate PU-UF3

PROGRAM PENTRU CONDUCEREA AGREGATULUI MARGA

PU-UF.BAS

REZULTATE PENTRU GRUPUL DE MASINI (TURBINA+GENERATOR)

\*\*\*\*\*

CONSTANTE:

| LAMB0 | RO [kg/m3] | S [m2] | R [m] | a     | b     | c      | d     | f     |
|-------|------------|--------|-------|-------|-------|--------|-------|-------|
| 3.000 | 1.500      | 15.900 | 2.250 | 1.780 | 0.045 | 15.330 | 0.110 | 0.510 |

\*\*\*\*\*

| Uf [V] | Pu [W]  | Pa [W]  | Paa [W] | Pp1 [W] | Pp2 [W] | Pp3 [W] | n [rpm] | v [m/s] | i [A] |
|--------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
| 50.00  | 32.15   | 55.72   | 55.72   | 0.70    | 8.46    | 14.41   | 28.25   | 2.22    | 0.21  |
| 60.00  | 67.21   | 97.50   | 97.50   | 2.14    | 10.79   | 17.36   | 34.04   | 2.67    | 0.37  |
| 70.00  | 118.54  | 157.03  | 157.03  | 4.88    | 13.26   | 20.35   | 39.90   | 3.13    | 0.56  |
| 80.00  | 189.68  | 238.54  | 238.54  | 9.58    | 15.90   | 23.39   | 45.86   | 3.60    | 0.79  |
| 90.00  | 284.49  | 346.69  | 346.69  | 17.02   | 18.69   | 26.49   | 51.95   | 4.08    | 1.05  |
| 100.00 | 407.51  | 487.13  | 487.13  | 28.29   | 21.66   | 29.67   | 58.19   | 4.57    | 1.36  |
| 110.00 | 564.19  | 666.77  | 666.77  | 44.81   | 24.82   | 32.95   | 64.60   | 5.07    | 1.71  |
| 120.00 | 760.54  | 893.46  | 893.46  | 68.42   | 28.17   | 36.32   | 71.22   | 5.59    | 2.11  |
| 130.00 | 1006.04 | 1179.68 | 1179.68 | 102.01  | 31.78   | 39.85   | 78.14   | 6.14    | 2.58  |
| 140.00 | 1311.82 | 1540.60 | 1540.60 | 149.55  | 35.67   | 43.56   | 85.41   | 6.71    | 3.12  |
| 150.00 | 1694.11 | 1998.83 | 1998.83 | 217.27  | 39.93   | 47.51   | 93.15   | 7.32    | 3.76  |
| 160.00 | 2177.40 | 2589.32 | 2589.32 | 315.45  | 44.67   | 51.79   | 101.55  | 7.98    | 4.54  |
| 170.00 | 2801.51 | 3370.71 | 3370.71 | 462.58  | 50.08   | 56.55   | 110.88  | 8.71    | 5.49  |
| 180.00 | 3670.93 | 4498.38 | 4498.38 | 708.44  | 56.75   | 62.26   | 122.07  | 9.59    | 6.80  |
| 190.00 | 5158.88 | 6551.99 | 6551.99 | 1255.75 | 66.80   | 70.57   | 138.37  | 10.87   | 9.05  |

### Fișierul cu rezultate PU-UF4

PROGRAM PENTRU CONDUCEREA AGREGATULUI MARGA

PU-UF.BAS

REZULTATE PENTRU GRUPUL DE MASINI (TURBINA+GENERATOR)

\*\*\*\*\*

CONSTANTE:

| LAMB0 | RO [kg/m3] | S [m2] | R [m] | a     | b     | c      | d     | f     |
|-------|------------|--------|-------|-------|-------|--------|-------|-------|
| 4.000 | 1.000      | 15.900 | 2.250 | 1.780 | 0.045 | 15.330 | 0.110 | 0.510 |

\*\*\*\*\*

| Uf [V] | Pu [W] | Pa [W] | Paa [W] | Pp1 [W] | Pp2 [W] | Pp3 [W] | n [rpm] | v [m/s] | i [A] |
|--------|--------|--------|---------|---------|---------|---------|---------|---------|-------|
| 50.00  | -6.04  | 16.69  | 16.69   | 0.02    | 8.39    | 14.31   | 28.06   | 1.65    | -0.04 |
| 60.00  | 1.10   | 28.95  | 28.95   | 0.00    | 10.65   | 17.19   | 33.71   | 1.99    | 0.01  |
| 70.00  | 12.97  | 46.16  | 46.16   | 0.06    | 13.04   | 20.09   | 39.39   | 2.32    | 0.06  |
| 80.00  | 30.46  | 69.25  | 69.25   | 0.25    | 15.55   | 23.00   | 45.09   | 2.66    | 0.13  |
| 90.00  | 54.47  | 99.18  | 99.18   | 0.62    | 18.17   | 25.92   | 50.83   | 2.99    | 0.20  |
| 100.00 | 85.94  | 136.95 | 136.95  | 1.26    | 20.89   | 28.86   | 56.60   | 3.33    | 0.29  |



|        |         |         |         |        |        |        |        |       |      |
|--------|---------|---------|---------|--------|--------|--------|--------|-------|------|
| 110.00 | 125.86  | 183.65  | 183.65  | 2.23   | 23.73  | 31.83  | 62.41  | 3.68  | 0.38 |
| 120.00 | 175.13  | 240.22  | 240.22  | 3.63   | 26.65  | 34.81  | 68.26  | 4.02  | 0.49 |
| 130.00 | 235.09  | 308.17  | 308.17  | 5.57   | 29.69  | 37.82  | 74.17  | 4.37  | 0.60 |
| 140.00 | 306.84  | 388.73  | 388.73  | 8.18   | 32.84  | 40.87  | 80.13  | 4.72  | 0.73 |
| 150.00 | 391.70  | 483.35  | 483.35  | 11.62  | 36.09  | 43.95  | 86.17  | 5.08  | 0.87 |
| 160.00 | 491.09  | 593.65  | 593.65  | 16.05  | 39.45  | 47.06  | 92.28  | 5.44  | 1.02 |
| 170.00 | 606.59  | 721.43  | 721.43  | 21.69  | 42.93  | 50.22  | 98.48  | 5.80  | 1.19 |
| 180.00 | 739.97  | 868.71  | 868.71  | 28.79  | 46.53  | 53.43  | 104.77 | 6.17  | 1.37 |
| 190.00 | 893.22  | 1037.81 | 1037.81 | 37.65  | 50.25  | 56.70  | 111.17 | 6.55  | 1.57 |
| 200.00 | 1067.74 | 1230.40 | 1230.40 | 48.55  | 54.10  | 60.01  | 117.66 | 6.93  | 1.78 |
| 210.00 | 1267.46 | 1451.01 | 1451.01 | 62.05  | 58.11  | 63.40  | 124.31 | 7.32  | 2.01 |
| 220.00 | 1494.86 | 1702.65 | 1702.65 | 78.64  | 62.28  | 66.87  | 131.11 | 7.72  | 2.26 |
| 230.00 | 1753.57 | 1989.64 | 1989.64 | 99.01  | 66.63  | 70.43  | 138.10 | 8.13  | 2.54 |
| 240.00 | 2047.98 | 2317.29 | 2317.29 | 124.03 | 71.18  | 74.10  | 145.30 | 8.56  | 2.84 |
| 250.00 | 2383.54 | 2692.23 | 2692.23 | 154.83 | 75.96  | 77.90  | 152.75 | 9.00  | 3.18 |
| 260.00 | 2767.12 | 3122.91 | 3122.91 | 192.93 | 81.00  | 81.85  | 160.49 | 9.45  | 3.55 |
| 270.00 | 3207.66 | 3620.42 | 3620.42 | 240.41 | 86.36  | 85.99  | 168.60 | 9.93  | 3.96 |
| 280.00 | 3717.08 | 4199.71 | 4199.71 | 300.18 | 92.10  | 90.35  | 177.15 | 10.43 | 4.43 |
| 290.00 | 4313.99 | 4884.25 | 4884.25 | 376.93 | 98.32  | 95.01  | 186.30 | 10.97 | 4.96 |
| 300.00 | 5020.99 | 5703.33 | 5703.33 | 477.13 | 105.16 | 100.05 | 196.18 | 11.56 | 5.58 |

### Fișierul cu rezultate PU-UF5

PROGRAM PENTRU CONDUCEREA AGREGATULUI MARGA

PU-UF.BAS

REZULTATE PENTRU GRUPUL DE MASINI (TURBINA+GENERATOR)

\*\*\*\*\*

CONSTANTE:

| LAMB0 | RO [kg/m3] | S [m2] | R [m] | a     | b     | c      | d     | f     |
|-------|------------|--------|-------|-------|-------|--------|-------|-------|
| 4.000 | 1.225      | 15.900 | 2.250 | 1.780 | 0.045 | 15.330 | 0.110 | 0.510 |

\*\*\*\*\*

| Uf [V] | Pu [W] | Pa [W] | Paa [W] | Pp1 [W] | Pp2 [W] | Pp3 [W] | n [rpm] | v [m/s] | i [A] |
|--------|--------|--------|---------|---------|---------|---------|---------|---------|-------|
|--------|--------|--------|---------|---------|---------|---------|---------|---------|-------|

\*\*\*\*\*

|        |         |         |         |        |       |       |        |       |       |
|--------|---------|---------|---------|--------|-------|-------|--------|-------|-------|
| 50.00  | -2.24   | 20.49   | 20.49   | 0.00   | 8.40  | 14.32 | 28.08  | 1.65  | -0.01 |
| 60.00  | 7.65    | 35.56   | 35.56   | 0.03   | 10.67 | 17.21 | 33.74  | 1.99  | 0.04  |
| 70.00  | 23.40   | 56.77   | 56.77   | 0.19   | 13.06 | 20.11 | 39.44  | 2.32  | 0.11  |
| 80.00  | 46.08   | 85.27   | 85.27   | 0.57   | 15.58 | 23.03 | 45.17  | 2.66  | 0.19  |
| 90.00  | 76.85   | 122.28  | 122.28  | 1.24   | 18.22 | 25.98 | 50.93  | 3.00  | 0.28  |
| 100.00 | 116.89  | 169.13  | 169.13  | 2.33   | 20.97 | 28.94 | 56.75  | 3.34  | 0.39  |
| 110.00 | 167.34  | 227.02  | 227.02  | 3.94   | 23.82 | 31.93 | 62.60  | 3.69  | 0.51  |
| 120.00 | 229.76  | 297.74  | 297.74  | 6.24   | 26.79 | 34.95 | 68.52  | 4.04  | 0.64  |
| 130.00 | 305.55  | 382.83  | 382.83  | 9.41   | 29.87 | 38.00 | 74.51  | 4.39  | 0.78  |
| 140.00 | 396.34  | 484.16  | 484.16  | 13.65  | 33.07 | 41.10 | 80.58  | 4.75  | 0.94  |
| 150.00 | 503.92  | 603.78  | 603.78  | 19.22  | 36.39 | 44.23 | 86.73  | 5.11  | 1.12  |
| 160.00 | 630.32  | 744.02  | 744.02  | 26.44  | 39.84 | 47.42 | 92.99  | 5.48  | 1.31  |
| 170.00 | 777.83  | 907.58  | 907.58  | 35.66  | 43.42 | 50.67 | 99.35  | 5.85  | 1.53  |
| 180.00 | 949.08  | 1097.57 | 1097.57 | 47.35  | 47.15 | 53.98 | 105.85 | 6.24  | 1.76  |
| 190.00 | 1145.98 | 1316.32 | 1316.32 | 61.97  | 51.02 | 57.36 | 112.46 | 6.62  | 2.01  |
| 200.00 | 1373.92 | 1570.20 | 1570.20 | 80.38  | 55.07 | 60.83 | 119.27 | 7.03  | 2.29  |
| 210.00 | 1636.52 | 1863.68 | 1863.68 | 103.44 | 59.31 | 64.40 | 126.28 | 7.44  | 2.60  |
| 220.00 | 1939.17 | 2203.39 | 2203.39 | 132.34 | 63.78 | 68.10 | 133.53 | 7.87  | 2.94  |
| 230.00 | 2288.72 | 2597.82 | 2597.82 | 168.67 | 68.49 | 71.94 | 141.07 | 8.31  | 3.32  |
| 240.00 | 2694.05 | 3058.15 | 3058.15 | 214.63 | 73.51 | 75.97 | 148.95 | 8.77  | 3.74  |
| 250.00 | 3167.10 | 3599.56 | 3599.56 | 273.36 | 78.89 | 80.21 | 157.27 | 9.26  | 4.22  |
| 260.00 | 3726.99 | 4246.48 | 4246.48 | 350.00 | 84.75 | 84.75 | 166.18 | 9.79  | 4.78  |
| 270.00 | 4390.16 | 5021.25 | 5021.25 | 450.33 | 91.13 | 89.62 | 175.72 | 10.35 | 5.42  |
| 280.00 | 5230.41 | 6018.55 | 6018.55 | 594.37 | 98.57 | 95.20 | 186.66 | 10.99 | 6.23  |

### Fișierul cu rezultate PU-UF6

PROGRAM PENTRU CONDUCEREA AGREGATULUI MARGA

PU-UF.BAS

## REZULTATE PENTRU GRUPUL DE MASINI (TURBINA+GENERATOR)

\*\*\*\*\*

## CONSTANTE:

| LAMB0  | RO [kg/m3] | S [m2]  | R [m]   | a       | b       | c       | d       | f       |       |  |
|--------|------------|---------|---------|---------|---------|---------|---------|---------|-------|--|
| 4.000  | 1.500      | 15.900  | 2.250   | 1.780   | 0.045   | 15.330  | 0.110   | 0.510   |       |  |
| *****  |            |         |         |         |         |         |         |         |       |  |
| Uf [V] | Pu [W]     | Pa [W]  | Paa [W] | Pp1 [W] | Pp2 [W] | Pp3 [W] | n [rpm] | v [m/s] | i [A] |  |
| *****  |            |         |         |         |         |         |         |         |       |  |
| 50.00  | 2.40       | 25.15   | 25.15   | 0.00    | 8.41    | 14.33   | 28.10   | 1.66    | 0.02  |  |
| 60.00  | 15.66      | 43.69   | 43.69   | 0.12    | 10.68   | 17.23   | 33.78   | 1.99    | 0.09  |  |
| 70.00  | 36.15      | 69.84   | 69.84   | 0.45    | 13.09   | 20.15   | 39.50   | 2.33    | 0.17  |  |
| 80.00  | 65.22      | 105.06  | 105.06  | 1.13    | 15.63   | 23.08   | 45.26   | 2.67    | 0.27  |  |
| 90.00  | 104.32     | 150.94  | 150.94  | 2.29    | 18.28   | 26.05   | 51.07   | 3.01    | 0.39  |  |
| 100.00 | 154.84     | 209.00  | 209.00  | 4.08    | 21.05   | 29.03   | 56.92   | 3.35    | 0.52  |  |
| 110.00 | 218.62     | 281.34  | 281.34  | 6.73    | 23.94   | 32.05   | 62.85   | 3.70    | 0.66  |  |
| 120.00 | 297.39     | 369.93  | 369.93  | 10.46   | 26.96   | 35.12   | 68.86   | 4.06    | 0.83  |  |
| 130.00 | 393.16     | 477.06  | 477.06  | 15.58   | 30.10   | 38.22   | 74.95   | 4.41    | 1.01  |  |
| 140.00 | 508.17     | 605.37  | 605.37  | 22.44   | 33.37   | 41.38   | 81.14   | 4.78    | 1.21  |  |
| 150.00 | 644.98     | 757.86  | 757.86  | 31.49   | 36.79   | 44.60   | 87.45   | 5.15    | 1.43  |  |
| 160.00 | 806.55     | 938.07  | 938.07  | 43.28   | 40.35   | 47.89   | 93.90   | 5.53    | 1.68  |  |
| 170.00 | 995.41     | 1149.10 | 1149.10 | 58.40   | 44.06   | 51.24   | 100.47  | 5.92    | 1.95  |  |
| 180.00 | 1217.04    | 1397.56 | 1397.56 | 77.87   | 47.96   | 54.69   | 107.24  | 6.32    | 2.25  |  |
| 190.00 | 1475.90    | 1689.00 | 1689.00 | 102.78  | 52.06   | 58.26   | 114.23  | 6.73    | 2.59  |  |
| 200.00 | 1778.32    | 2031.34 | 2031.34 | 134.67  | 56.40   | 61.95   | 121.48  | 7.16    | 2.96  |  |
| 210.00 | 2132.45    | 2434.91 | 2434.91 | 175.64  | 61.00   | 65.81   | 129.04  | 7.60    | 3.38  |  |
| 220.00 | 2549.17    | 2913.67 | 2913.67 | 228.69  | 65.94   | 69.87   | 137.00  | 8.07    | 3.86  |  |
| 230.00 | 3043.54    | 3487.27 | 3487.27 | 298.27  | 71.28   | 74.18   | 145.46  | 8.57    | 4.41  |  |
| 240.00 | 3635.17    | 4181.87 | 4181.87 | 390.78  | 77.11   | 78.81   | 154.54  | 9.10    | 5.05  |  |
| 250.00 | 4374.91    | 5064.33 | 5064.33 | 521.62  | 83.78   | 84.01   | 164.72  | 9.70    | 5.83  |  |
| 260.00 | 5341.10    | 6241.71 | 6241.71 | 718.81  | 91.73   | 90.07   | 176.61  | 10.40   | 6.85  |  |

### 3.10. Programul DERIVA

#### 3.10.1. Programul DERIVA.BAS

##### Varianta 1

```

REM program pentru calculul derivei turbinei pentru MARGA
REM Numele programului "DERIVA" REZULTATE PE derivaJ
REM constantele pentru calcul D diametrul turbinei,R raza turbinei ,ST aria
expusa a turbinei,SD aria derivei, E distanta turbinei de axa de pivotare,V
viteza vantului,L distanta centrului de presiune al derivei fata de axa de
pivitare
REM ART distanta centrului de articulare a derivei fata de axa de pivotare
REM Unghiul intre viteza vantului si axa turbinei GAMT
REM Unghiul intre viteza vantului si directia derivei GAMD
REM Unghiul intre axa turbinei si axa derivei
REM Unitati SI unghiuri grade sex
REM rapoarte geometrice pentru comparatie
REM kS=SD/ST;kL=L/D;KSDL=SD*L;kLE=L/E
REM forte pe turbina si descentrarea punctului de aplicatie
imax = 7
DIM CAX(imax), CTG(imax), GAMT(imax), CA(imax), FTax(imax), FTtg(imax), A(imax)
D = 4.5: R = 2.25: ST = 15: RO = 1.225: v = 10: E = .15: Sd = .5
L = 1.2: ART = .6
PI = 3.1415
kS = Sd / ST: kL = L / D: kSDL = Sd * L: kLE = L / E
jmax = 5

```

```

DIM GAMd(jmax), Cyd(jmax), Cxd(jmax)
DIM Fperpd(jmax), Fyd(jmax), Fxd(jmax), Faxd(jmax)
DIM EPS(jmax, imax), B(jmax, imax), Mder(jmax, imax)
DIM Mturb(imax)
FOR j = 1 TO jmax
GAMd(j) = 10 * j
Cyd(j) = .4 * SIN(2 * GAMd(j) * PI / 180): Cxd(j) = 2 * SIN(GAMd(j) * PI / 180)
Fyd(j) = Cyd(j) * RO / 2 * v ^ 2 * Sd: Fxd(j) = Cxd(j) * RO / 2 * v ^ 2 * Sd
Faxd(j) = Fxd(j) * COS(GAMd(j) * PI / 180) - Fyd(j) * SIN(GAMd(j) * PI / 180)
Fperpd(j) = Fyd(j) * COS(GAMd(j) * PI / 180) + Fxd(j) * SIN(GAMd(j) * PI / 180)
REM momente fata de axa de orientare
REM B(j) = ART * SIN(EPS(j) * PI / 180)
REM Mder(j) = Fperp(j) * (L + ART * COS(EPS(j) * PI / 180)) + Faxd(j) * B(j)
FOR i = 1 TO imax
GAMT(i) = i * 10
CAX(i) = .7 - .00016 * GAMT(i) ^ 2
CTG(i) = .2 - 2.5 / GAMT(i)
CA(i) = .0005 * GAMT(i)
FTax(i) = CAX(i) * RO / 2 * v ^ 2 * ST
FTtg(i) = CTG(i) * RO / 2 * v ^ 2 * ST
A(i) = CA(i) * R
EPS(j, i) = GAMT(i) - GAMd(j)
B(j, i) = ART * SIN(EPS(j, i) * PI / 180)
NEXT i
NEXT j
REM calculul momentelor fata de axa de orientare
FOR j = 1 TO jmax
FOR i = 1 TO imax
Mturb(i) = FTtg(i) * E - FTax(i) * A(i)
Mder(j, i) = Fperpd(j) * (L + ART * COS(EPS(j, i) * PI / 180)) + Faxd(j) * B(j,
i)
NEXT i
NEXT j
REM afisajul rezultatelor
PRINT "          CALCULE PENTRU DERIVA"
PRINT "          _____"
PRINT "CONSTANTE: ST[m2]="; ST; " Sd[m2]="; Sd; " v[m/s]="; v; " E[m]="; E
PRINT "L[m]="; L; " ART[m]="; ART; " D[m]="; D; " RO[kg/m3]="; RO
PRINT "Sd/ST[-]="; kS; " L/D[-]="; kL; " Sd*L[m3]="; kSdL; " L/E[-]="; kLE
PRINT "*****"
PRINT "GAMT   DATELE TURBINEI           DATELE DERIVEI           DELM"
PRINT "      FTax   FTtg   Mturb   Fperpd   Faxd   Mder   "
PRINT " gr      N      N      Nm      N      N      Nm      Nm"
PRINT "*****"
FOR j = 1 TO jmax
PRINT "Unghi al derivei fata de viteza vantului GAMd[gr]="; GAMd(j)
FOR i = 1 TO imax
PRINT USING "####          "; GAMT(i); FTax(i); FTtg(i); Mturb(i); Fperpd(j);
Faxd(j); Mder(j, i); Mder(j, i) - Mturb(i)
NEXT i
NEXT j
END

```

## Varianta 2

```

REM program pentru calculul derivei turbinei pentru MARGA
REM Numele programului "DERIVA" REZULTATE PE derivaJ
REM constantele pentru calcul D diametrul turbinei, R raza turbinei ,ST aria
expusa a turbinei, SD aria derivei, E distanta turbinei de axa de pivotare, V

```

```

viteza vantului,L distanta centrului de presiune al derivei fata de axa de
pivotare
REM ART distanta centrului de articulare a derivei fata de axa de pivotare
REM Unghiul intre viteza vantului si axa turbinei GAMT
REM Unghiul intre viteza vantului si directia derivei GAMD
REM Unghiul intre axa turbinei si axa derivei EPS
REM Unitati SI unghiuri grade sex
REM rapoarte geometrice pentru comparatie
REM kS=SD/ST;kL=L/D;KSdL=SD*L;kLE=L/E
REM forte pe turbina si descentrarea punctului de aplicatie
imax = 7
DIM CAX(imax), CTG(imax), GAMT(imax), CA(imax), FTax(imax), FTtg(imax), A(imax)
D = 4.5: R = 2.25: ST = 15: RO = 1.225: v = 10: E = .8: Sd = 4.05
L = 1.5: ART = .5
PI = 3.1415
kS = Sd / ST: kL = L / D: kSdL = Sd * L: kLE = L / E
jmax = 5
DIM GAMd(jmax), Cyd(jmax), Cxd(jmax)
DIM Fperpd(jmax), Fyd(jmax), Fxd(jmax), Faxd(jmax)
DIM EPS(jmax, imax), B(jmax, imax), Mder(jmax, imax)
DIM Mturb(imax)
FOR j = 1 TO jmax
GAMd(j) = 10 * j
Cyd(j) = .4 * SIN(2 * GAMd(j) * PI / 180): Cxd(j) = 2 * SIN(GAMd(j) * PI / 180)
Fyd(j) = Cyd(j) * RO / 2 * v ^ 2 * Sd: Fxd(j) = Cxd(j) * RO / 2 * v ^ 2 * Sd
Faxd(j) = Fxd(j) * COS(GAMd(j) * PI / 180) - Fyd(j) * SIN(GAMd(j) * PI / 180)
Fperpd(j) = Fyd(j) * COS(GAMd(j) * PI / 180) + Fxd(j) * SIN(GAMd(j) * PI / 180)
REM momente fata de axa de orientare
REM B(j) = ART * SIN(EPS(j) * PI / 180)
REM Mder(j) = Fperpd(j) * (L + ART * COS(EPS(j) * PI / 180)) + Faxd(j) * B(j)
FOR i = 1 TO imax
GAMT(i) = i * 10
CAX(i) = .7 - .00016 * GAMT(i) ^ 2
CTG(i) = .2 - 2.5 / GAMT(i)
CA(i) = .0005 * GAMT(i)
FTax(i) = CAX(i) * RO / 2 * v ^ 2 * ST
FTtg(i) = CTG(i) * RO / 2 * v ^ 2 * ST
A(i) = CA(i) * R
EPS(j, i) = GAMT(i) - GAMd(j)
B(j, i) = ART * SIN(EPS(j, i) * PI / 180)
NEXT i
NEXT j
REM calculul momentelor fata de axa de orientare
FOR j = 1 TO jmax
FOR i = 1 TO imax
Mturb(i) = FTtg(i) * E - FTax(i) * A(i)
Mder(j, i) = Fperpd(j) * (L + ART * COS(EPS(j, i) * PI / 180)) + Faxd(j) * B(j,
i)
NEXT i
NEXT j
REM afisajul rezultatelor
PRINT "          CALCULE PENTRU DERIVA"
PRINT "          _____"
PRINT "CONSTANTE: ST[m2]="; ST; " Sd[m2]="; Sd; " v[m/s]="; v; " E[m]="; E
PRINT "L[m]="; L; " ART[m]="; ART; " D[m]="; D; " RO[kg/m3]="; RO
PRINT "Sd/ST[-]="; kS; " L/D[-]="; kL; " Sd*L[m3]="; kSdL; " L/E[-]="; kLE
PRINT "*****"
PRINT "GAMT   DATELE TURBINEI           DATELE DERIVEI           DELM"
PRINT "      FTax   FTtg   Mturb   Fperpd   Faxd   Mder   "
PRINT " gr      N      N      Nm      N      N      Nm      Nm"
PRINT "*****"

```

```

FOR j = 1 TO jmax
PRINT "Unghi al derivei fata de viteza vantului GAMd[gr]="; GAMd(j)
FOR i = 1 TO imax
PRINT USING "####          "; GAMT(i); FTax(i); FTtg(i); Mturb(i); Fperpd(j);
Faxd(j); Mder(j, i); Mder(j, i) - Mturb(i)
NEXT i
NEXT j
END

```

### 3.10.2. Programul DERIVAR.BAS

#### Varianta 1

```

REM program pentru calculul derivei turbinei pentru MARGA
REM Numele programului "DERIVA" REZULTATE: derivaJ
REM constantele pentru calcul D diametrul turbinei,R raza turbinei ,ST aria
expusa a turbinei,SD aria derivei, E distanta turbinei de axa de pivotare,V
viteza vantului,L distanta centrului de presiune al derivei fata de axa de
pivitate
REM ART distanta centrului de articulare a derivei fata de axa de pivotare
REM Unghiul intre viteza vantului si axa turbinei GAMT
REM Unghiul intre viteza vantului si directia derivei GAMD
REM Unghiul intre axa turbinei si axa derivei
REM Unitati SI unghiuri grade sex
REM rapoarte geometrice pentru comparatie
REM kS=SD/ST;kL=L/D;KSdL=SD*L;kLE=L/E
REM forte pe turbina si descentrarea punctului de aplicatie
imax = 7
DIM CAX(imax), CTG(imax), GAMT(imax), CA(imax), FTax(imax), FTtg(imax), A(imax)
REM atentie !introduceri noi de date! pentru alt caz
D = 4.5: R = 2.25: ST = 15: RO = 1.225: v = 10: E = .3: Sd = 1.5
L = 1.5: ART = .7
PI = 3.1415
kS = Sd / ST: kL = L / D: kSdL = Sd * L: kLE = L / E
jmax = 5
DIM GAMd(jmax), Cyd(jmax), Cxd(jmax)
DIM Fperpd(jmax), Fyd(jmax), Fxd(jmax), Faxd(jmax)
DIM EPS(jmax, imax), B(jmax, imax), Mder(jmax, imax)
DIM Mturb(imax)
FOR j = 1 TO jmax
GAMd(j) = 10 * j
Cyd(j) = .4 * SIN(2 * GAMd(j) * PI / 180): Cxd(j) = 2 * SIN(GAMd(j) * PI / 180)
Fyd(j) = Cyd(j) * RO / 2 * v ^ 2 * Sd: Fxd(j) = Cxd(j) * RO / 2 * v ^ 2 * Sd
Faxd(j) = Fxd(j) * COS(GAMd(j) * PI / 180) - Fyd(j) * SIN(GAMd(j) * PI / 180)
Fperpd(j) = Fyd(j) * COS(GAMd(j) * PI / 180) + Fxd(j) * SIN(GAMd(j) * PI / 180)
REM momente fata de axa de orientare
REM B(j) = ART * SIN(EPS(j) * PI / 180)
REM Mder(j) = Fperp(j) * (L + ART * COS(EPS(j) * PI / 180)) + Faxd(j) * B(j)
FOR i = 1 TO imax
GAMT(i) = i * 10
CAX(i) = .7 - .00016 * GAMT(i) ^ 2
CTG(i) = .2 - 2.5 / GAMT(i)
CA(i) = .0005 * GAMT(i)
FTax(i) = CAX(i) * RO / 2 * v ^ 2 * ST
FTtg(i) = CTG(i) * RO / 2 * v ^ 2 * ST
A(i) = CA(i) * R
EPS(j, i) = GAMT(i) - GAMd(j)
B(j, i) = ART * SIN(EPS(j, i) * PI / 180)

```

```

NEXT i
NEXT j
REM calculul momentelor fata de axa de orientare
FOR j = 1 TO jmax
FOR i = 1 TO imax
Mturbo(i) = FTtg(i) * E - FTax(i) * A(i)
Mder(j, i) = Fperpd(j) * (L + ART * COS(EPS(j, i) * PI / 180)) + Faxd(j) * B(j,
i)
NEXT i
NEXT j
REM afisajul rezultatelor
INPUT "enter filename DERIVARj"; n$
OPEN n$ FOR OUTPUT AS #1
PRINT #1, "          CALCULE PENTRU DERIVA          "; n$
PRINT "          _____          "
PRINT #1, "CONSTANTE: ST[m2]="; ST; " Sd[m2]="; Sd; " v[m/s]="; v; " E[m]="; E
PRINT #1, "L[m]="; L; " ART[m]="; ART; " D[m]="; D; " RO[kg/m3]="; RO
PRINT #1, "Sd/ST[-]="; kS; " L/D[-]="; kL; " Sd*L[m3]="; kSdL; " L/E[-]=";
kLE
PRINT #1,
"*****"
PRINT #1, "GAMT      DATELE TURBINEI      POZ.DERIVEI      MOMENT INSUMAT      "
PRINT #1, "      FTax      FTtg      Mturbo      EPS      Mder      DELM      "
PRINT #1, " gr      N      N      Nm      gr      Nm      Nm      "
PRINT #1,
"*****"
FOR j = 1 TO jmax
PRINT #1, "Unghi al derivei fata de viteza vantului GAMd[gr]="; GAMd(j)
PRINT #1, "Datele derivei Fperp[N]="; Fperpd(j); "Faxd[N]="; Faxd(j)
FOR i = 1 TO imax
PRINT #1, USING "####      "; GAMT(i); FTax(i); FTtg(i); Mturbo(i); EPS(j, i);
Mder(j, i); Mder(j, i) - Mturbo(i)
NEXT i
NEXT j
PRINT #1, "OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca
deriva este deplasata contra vantului"
CLOSE
END

```

## Varianta 2

```

REM program pentru calculul derivei turbinei pentru MARGA
REM Numele programului "DERIVA" REZULTATE PE derivaJ
REM constantele pentru calcul D diametrul turbinei,R raza turbinei ,ST aria
expusa a turbinei,SD aria derivei, E distanta turbinei de axa de pivotare,V
viteza vantului,L distanta centrului de presiune al derivei fata de axa de
pivitate
REM ART distanta centrului de articulare a derivei fata de axa de pivotare
REM Unghiul intre viteza vantului si axa turbinei GAMT
REM Unghiul intre viteza vantului si directia derivei GAMD
REM Unghiul intre axa turbinei si axa derivei EPS
REM Unitati SI ; unghiuri grade sex
REM rapoarte geometrice pentru comparatie
REM kS=SD/ST;kL=L/D;KSDL=SD*L;kLE=L/E
REM forte pe turbina si descentrarea punctului de aplicatie
imax = 7
DIM CAX(imax), CTG(imax), GAMT(imax), CA(imax), FTax(imax), FTtg(imax), A(imax)
REM atentie !introduceri noi de date! pentru alt caz

```

```

D = 4.5: R = 2.25: ST = 15: RO = 1.225: v = 10: E = .8: Sd = 6.6: L = 2: ART =
.5
PI = 3.1415
kS = Sd / ST: kL = L / D: kSdL = Sd * L: kLE = L / E
jmax = 5
DIM GAMd(jmax), Cyd(jmax), Cxd(jmax)
DIM Fperpd(jmax), Fyd(jmax), Fxd(jmax), Faxd(jmax)
DIM EPS(jmax, imax), B(jmax, imax), Mder(jmax, imax)
DIM Mturb(imax)
FOR j = 1 TO jmax
GAMd(j) = 10 * j
Cyd(j) = .4 * SIN(2 * GAMd(j) * PI / 180): Cxd(j) = 2 * SIN(GAMd(j) * PI / 180)
Fyd(j) = Cyd(j) * RO / 2 * v ^ 2 * Sd: Fxd(j) = Cxd(j) * RO / 2 * v ^ 2 * Sd
Faxd(j) = Fxd(j) * COS(GAMd(j) * PI / 180) - Fyd(j) * SIN(GAMd(j) * PI / 180)
Fperpd(j) = Fyd(j) * COS(GAMd(j) * PI / 180) + Fxd(j) * SIN(GAMd(j) * PI / 180)
REM momente fata de axa de orientare
REM B(j) = ART * SIN(EPS(j) * PI / 180)
REM Mder(j) = Fperpd(j) * (L + ART * COS(EPS(j) * PI / 180)) + Faxd(j) * B(j)
FOR i = 1 TO imax
GAMT(i) = i * 10
CAX(i) = .7 - .00016 * GAMT(i) ^ 2
CTG(i) = .2 - 2.5 / GAMT(i)
CA(i) = .0005 * GAMT(i)
FTax(i) = CAX(i) * RO / 2 * v ^ 2 * ST
FTtg(i) = CTG(i) * RO / 2 * v ^ 2 * ST
A(i) = CA(i) * R
EPS(j, i) = GAMT(i) - GAMd(j)
B(j, i) = ART * SIN(EPS(j, i) * PI / 180)
NEXT i
NEXT j
REM calculul momentelor fata de axa de orientare
FOR j = 1 TO jmax
FOR i = 1 TO imax
Mturb(i) = FTtg(i) * E - FTax(i) * A(i)
Mder(j, i) = Fperpd(j) * (L + ART * COS(EPS(j, i) * PI / 180)) + Faxd(j) * B(j,
i)
NEXT i
NEXT j
REM afisajul rezultatelor
INPUT "enter filename DERIVARj"; n$
OPEN n$ FOR OUTPUT AS #1
PRINT #1, "          CALCULE PENTRU DERIVA          "; n$
PRINT #1, "          _____          "
PRINT #1, "CONSTANTE: ST[m2]="; ST; " Sd[m2]="; Sd; " v[m/s]="; v; " E[m]="; E
PRINT #1, "L[m]="; L; " ART[m]="; ART; " D[m]="; D; " RO[kg/m3]="; RO
PRINT #1, "Sd/ST[-]="; kS; " L/D[-]="; kL; " Sd*L[m3]="; kSdL; " L/E[-]=";
kLE
PRINT #1,
"*****"
PRINT #1, "GAMT      DATELE TURBINEI      POZ.DERIVEI      MOMENT INSUMAT      "
PRINT #1, "      FTax      FTtg      Mturb      EPS      Mder      DELM      "
PRINT #1, " gr      N      N      Nm      gr      Nm      Nm      "
PRINT #1,
"*****"
FOR j = 1 TO jmax
PRINT #1, "Unghi al derivei fata de viteza vantului GAMd[gr]="; GAMd(j)
PRINT #1, "Datele derivei Fperp[N]="; Fperpd(j); "Faxd[N]="; Faxd(j)
FOR i = 1 TO imax
PRINT #1, USING "####      "; GAMT(i); FTax(i); FTtg(i); Mturb(i); EPS(j, i);
Mder(j, i); Mder(j, i) - Mturb(i)
NEXT i

```

```

NEXT j
PRINT #1, "OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca
deriva este deplasata contra vantului"
CLOSE
END
    
```

### 3.10.3. Analiza cazurilor

| Nr. crt. | Programul   | L [m] | ART [m] | S <sub>d</sub> [m <sup>2</sup> ] | v [m/s] | E [m] | Fișier cu rezultate |
|----------|-------------|-------|---------|----------------------------------|---------|-------|---------------------|
| 1        | DERIVA var1 | 1,5   | 0,7     | 1,5                              | 15      | 0,25  | DERIVAR1 var1       |
| 2        | DERIVA var1 | 1,5   | 0,5     | 1,5                              | 15      | 0,25  | DERIVAR2 var1       |
| 3        | DERIVA var1 | 1,5   | 0,5     | 1,5                              | 10      | 0,25  | DERIVAR3 var1       |
| 4        | DERIVA var1 | 1,5   | 0,5     | 1,0                              | 10      | 0,25  | DERIVAR4 var1       |
| 5        | DERIVA var1 | 1,5   | 0,6     | 0,75                             | 15      | 0,25  | DERIVAR5 var1       |
| 6        | DERIVA var1 | 1,5   | 0,5     | 0,75                             | 10      | 0,25  | DERIVAR6 var1       |
| 7        | DERIVA var1 | 1,5   | 0,7     | 1,5                              | 15      | 0,3   | DERIVAR7 var1       |
| 8        |             | 1,5   | 0,5     | 4,05                             | 10      | 0,8   |                     |
| 9        |             | 1,2   | 0,6     | 0,5                              | 10      | 0,15  |                     |
| 10       | DERIVA var2 | 1,5   | 0,5     | 4                                | 10      | 0,8   | DERIVAR1 var2       |
| 11       | DERIVA var2 | 2     | 0,5     | 6,6                              | 10      | 0,8   | DERIVAR2 var2       |
| 12       | DERIVA var2 | 1,5   | 0,5     | 1,5                              | 10      | 0,25  | DERIVAR3 var2       |
| 13       | DERIVA var2 | 1,5   | 0,5     | 1                                | 10      | 0,25  | DERIVAR4 var2       |
| 14       | DERIVA var2 | 1,5   | 0,6     | 0,75                             | 10      | 0,25  | DERIVAR5 var2       |
| 15       | DERIVA var2 | 1,5   | 0,5     | 0,75                             | 10      | 0,25  | DERIVAR6 var2       |
| 16       | DERIVA var2 | 1,5   | 0,7     | 1,5                              | 10      | 0,3   | DERIVAR7 var2       |
| 17       |             | 1,6   | 0,25    | 3                                | 15      | 0,25  | DERIVF1             |
| 18       |             | 1,6   | 0,25    | 3                                | 10      | 0,25  | DERIVF2             |

### 3.10.4. Rezultatele programelor DERIVA.BAS și DERIVAR.BAS

#### Fișierul cu rezultate DERIVAR1

```

CALCULE PENTRU DERIVA      „DERIVAR1”
CONSTANTE: ST[m2]= 15   Sd[m2]= 1.5   v[m/s]= 15   E[m]= .25
L[m]= 1.5   ART[m]= .7   D[m]= 4.5   RO[kg/m3]= 1.225
Sd/ST[-]= .1   L/D[-]= .3333333   Sd*L[m3]= 2.25   L/E[-]= 6
*****
GAMT          DATELE TURBINEI      POZ.DERIVEI      MOMENT INSUMAT
    
```



| gr  | FTax<br>N | FTtg<br>N | Mturb<br>Nm | EPS<br>gr | Mder<br>Nm | DELM<br>Nm |
|---|-----------|-----------|-------------|-----------|------------|------------|
| *****   |           |           |             |           |            |            |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 10 |           |           |             |           |            |            |
| Datele derivei Fperp[N]= 40.31632 Faxd[N]= 65.78935   |           |           |             |           |            |            |
| 10  | 1414      | -103      | -42         | 0         | 89         | 130        |
| 20  | 1315      | 155       | 9           | 10        | 96         | 87         |
| 30  | 1149      | 241       | 22          | 20        | 103        | 81         |
| 40  | 918       | 284       | 30          | 30        | 108        | 78         |
| 50  | 620       | 310       | 43          | 40        | 112        | 69         |
| 60  | 256       | 327       | 65          | 50        | 114        | 49         |
| 70  | -174      | 340       | 99          | 60        | 114        | 16         |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 20 |           |           |             |           |            |            |
| Datele derivei Fperp[N]= 98.30436 Faxd[N]= 114.6954   |           |           |             |           |            |            |
| 10  | 1414      | -103      | -42         | -10       | 201        | 243        |
| 20  | 1315      | 155       | 9           | 0         | 216        | 207        |
| 30  | 1149      | 241       | 22          | 10        | 229        | 208        |
| 40  | 918       | 284       | 30          | 20        | 240        | 210        |
| 50  | 620       | 310       | 43          | 30        | 247        | 205        |
| 60  | 256       | 327       | 65          | 40        | 252        | 187        |
| 70  | -174      | 340       | 99          | 50        | 253        | 155        |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 30 |           |           |             |           |            |            |
| Datele derivei Fperp[N]= 165.3689 Faxd[N]= 143.2174   |           |           |             |           |            |            |
| 10  | 1414      | -103      | -42         | -20       | 323        | 364        |
| 20  | 1315      | 155       | 9           | -10       | 345        | 335        |
| 30  | 1149      | 241       | 22          | 0         | 364        | 342        |
| 40  | 918       | 284       | 30          | 10        | 379        | 350        |
| 50  | 620       | 310       | 43          | 20        | 391        | 348        |
| 60  | 256       | 327       | 65          | 30        | 398        | 334        |
| 70  | -174      | 340       | 99          | 40        | 401        | 303        |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 40 |           |           |             |           |            |            |
| Datele derivei Fperp[N]= 233.1947 Faxd[N]= 151.2354   |           |           |             |           |            |            |
| 10  | 1414      | -103      | -42         | -30       | 438        | 480        |
| 20  | 1315      | 155       | 9           | -20       | 467        | 458        |
| 30  | 1149      | 241       | 22          | -10       | 492        | 471        |
| 40  | 918       | 284       | 30          | 0         | 513        | 483        |
| 50  | 620       | 310       | 43          | 10        | 529        | 486        |
| 60  | 256       | 327       | 65          | 20        | 539        | 475        |
| 70  | -174      | 340       | 99          | 30        | 544        | 446        |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 50 |           |           |             |           |            |            |
| Datele derivei Fperp[N]= 294.9497 Faxd[N]= 141.2009   |           |           |             |           |            |            |
| 10  | 1414      | -103      | -42         | -40       | 537        | 579        |
| 20  | 1315      | 155       | 9           | -30       | 572        | 563        |
| 30  | 1149      | 241       | 22          | -20       | 603        | 581        |
| 40  | 918       | 284       | 30          | -10       | 629        | 599        |
| 50  | 620       | 310       | 43          | 0         | 649        | 606        |
| 60  | 256       | 327       | 65          | 10        | 663        | 598        |
| 70  | -174      | 340       | 99          | 20        | 670        | 572        |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

## Fișierul cu rezultate DERIVAR2

CALCULE PENTRU DERIVA „DERIVAR2”

CONSTANTE: ST[m2]= 15 Sd[m2]= 1.5 v[m/s]= 15 E[m]= .25  
L[m]= 1.5 ART[m]= .5 D[m]= 4.5 RO[kg/m3]= 1.225  
Sd/ST[-]= .1 L/D[-]= .333333 Sd\*L[m3]= 2.25 L/E[-]= 6

\*\*\*\*\*

| GAMT  | DATELE TURBINEI |           |             | POZ.DERIVEI |            | MOMENT INSUMAT |
|-------|-----------------|-----------|-------------|-------------|------------|----------------|
| gr    | FTax<br>N       | FTtg<br>N | Mturb<br>Nm | EPS<br>gr   | Mder<br>Nm | DELM<br>Nm     |
| ***** |                 |           |             |             |            |                |

Unghi al derivei fata de viteza vantului GAMd[gr]= 10

Datele derivei Fperp[N]= 40.31632 Faxd[N]= 65.78935

|    |      |      |     |    |    |     |
|----|------|------|-----|----|----|-----|
| 10 | 1414 | -103 | -42 | 0  | 81 | 122 |
| 20 | 1315 | 155  | 9   | 10 | 86 | 77  |
| 30 | 1149 | 241  | 22  | 20 | 91 | 69  |
| 40 | 918  | 284  | 30  | 30 | 94 | 65  |
| 50 | 620  | 310  | 43  | 40 | 97 | 54  |
| 60 | 256  | 327  | 65  | 50 | 99 | 34  |
| 70 | -174 | 340  | 99  | 60 | 99 | 0   |

Unghi al derivei fata de viteza vantului GAMd[gr]= 20

Datele derivei Fperp[N]= 98.30436 Faxd[N]= 114.6954

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -10 | 186 | 228 |
| 20 | 1315 | 155  | 9   | 0   | 197 | 187 |
| 30 | 1149 | 241  | 22  | 10  | 206 | 184 |
| 40 | 918  | 284  | 30  | 20  | 213 | 184 |
| 50 | 620  | 310  | 43  | 30  | 219 | 176 |
| 60 | 256  | 327  | 65  | 40  | 222 | 157 |
| 70 | -174 | 340  | 99  | 50  | 223 | 124 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 30

Datele derivei Fperp[N]= 165.3689 Faxd[N]= 143.2174

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -20 | 301 | 343 |
| 20 | 1315 | 155  | 9   | -10 | 317 | 308 |
| 30 | 1149 | 241  | 22  | 0   | 331 | 309 |
| 40 | 918  | 284  | 30  | 10  | 342 | 312 |
| 50 | 620  | 310  | 43  | 20  | 350 | 308 |
| 60 | 256  | 327  | 65  | 30  | 355 | 291 |
| 70 | -174 | 340  | 99  | 40  | 357 | 259 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 40

Datele derivei Fperp[N]= 233.1947 Faxd[N]= 151.2354

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -30 | 413 | 455 |
| 20 | 1315 | 155  | 9   | -20 | 433 | 424 |
| 30 | 1149 | 241  | 22  | -10 | 451 | 430 |
| 40 | 918  | 284  | 30  | 0   | 466 | 437 |
| 50 | 620  | 310  | 43  | 10  | 478 | 435 |
| 60 | 256  | 327  | 65  | 20  | 485 | 421 |
| 70 | -174 | 340  | 99  | 30  | 489 | 390 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 50

Datele derivei Fperp[N]= 294.9497 Faxd[N]= 141.2009

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -40 | 510 | 552 |
| 20 | 1315 | 155  | 9   | -30 | 535 | 526 |
| 30 | 1149 | 241  | 22  | -20 | 557 | 535 |
| 40 | 918  | 284  | 30  | -10 | 575 | 546 |
| 50 | 620  | 310  | 43  | 0   | 590 | 547 |
| 60 | 256  | 327  | 65  | 10  | 600 | 535 |
| 70 | -174 | 340  | 99  | 20  | 605 | 507 |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

### Fișierul cu rezultate DERIVAR3

CALCULE PENTRU DERIVA „DERIVAR3”

CONSTANTE: ST[m2]= 15 Sd[m2]= 1.5 v[m/s]= 10 E[m]= .25

L[m]= 1.5 ART[m]= .5 D[m]= 4.5 RO[kg/m3]= 1.225

Sd/ST[-]= .1 L/D[-]= .3333333 Sd\*L[m3]= 2.25 L/E[-]= 6

\*\*\*\*\*

GAMT DATELE TURBINEI POZ.DERIVEI MOMENT INSUMAT

FTax FTtg Mturb EPS Mder DELM

gr N N Nm gr Nm Nm

\*\*\*\*\*

Unghi al derivei fata de viteza vantului GAMd[gr]= 10

Datele derivei Fperp[N]= 17.91837 Faxd[N]= 29.23971

|    |     |     |     |   |    |    |
|----|-----|-----|-----|---|----|----|
| 10 | 628 | -46 | -19 | 0 | 36 | 54 |
|----|-----|-----|-----|---|----|----|

|   |     |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|-----|
| 20  | 584 | 69  | 4   | 10  | 38  | 34  |
| 30  | 511 | 107 | 10  | 20  | 40  | 31  |
| 40  | 408 | 126 | 13  | 30  | 42  | 29  |
| 50  | 276 | 138 | 19  | 40  | 43  | 24  |
| 60  | 114 | 145 | 29  | 50  | 44  | 15  |
| 70  | -77 | 151 | 44  | 60  | 44  | 0   |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 20 |     |     |     |     |     |     |
| Datele derivei Fperp[N]= 43.69083 Faxd[N]= 50.97574   |     |     |     |     |     |     |
| 10  | 628 | -46 | -19 | -10 | 83  | 101 |
| 20  | 584 | 69  | 4   | 0   | 87  | 83  |
| 30  | 511 | 107 | 10  | 10  | 91  | 82  |
| 40  | 408 | 126 | 13  | 20  | 95  | 82  |
| 50  | 276 | 138 | 19  | 30  | 97  | 78  |
| 60  | 114 | 145 | 29  | 40  | 99  | 70  |
| 70  | -77 | 151 | 44  | 50  | 99  | 55  |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 30 |     |     |     |     |     |     |
| Datele derivei Fperp[N]= 73.4973 Faxd[N]= 63.65216    |     |     |     |     |     |     |
| 10  | 628 | -46 | -19 | -20 | 134 | 152 |
| 20  | 584 | 69  | 4   | -10 | 141 | 137 |
| 30  | 511 | 107 | 10  | 0   | 147 | 137 |
| 40  | 408 | 126 | 13  | 10  | 152 | 139 |
| 50  | 276 | 138 | 19  | 20  | 156 | 137 |
| 60  | 114 | 145 | 29  | 30  | 158 | 129 |
| 70  | -77 | 151 | 44  | 40  | 159 | 115 |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 40 |     |     |     |     |     |     |
| Datele derivei Fperp[N]= 103.6421 Faxd[N]= 67.21573   |     |     |     |     |     |     |
| 10  | 628 | -46 | -19 | -30 | 184 | 202 |
| 20  | 584 | 69  | 4   | -20 | 193 | 189 |
| 30  | 511 | 107 | 10  | -10 | 201 | 191 |
| 40  | 408 | 126 | 13  | 0   | 207 | 194 |
| 50  | 276 | 138 | 19  | 10  | 212 | 193 |
| 60  | 114 | 145 | 29  | 20  | 216 | 187 |
| 70  | -77 | 151 | 44  | 30  | 217 | 173 |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 50 |     |     |     |     |     |     |
| Datele derivei Fperp[N]= 131.0888 Faxd[N]= 62.75594   |     |     |     |     |     |     |
| 10  | 628 | -46 | -19 | -40 | 227 | 245 |
| 20  | 584 | 69  | 4   | -30 | 238 | 234 |
| 30  | 511 | 107 | 10  | -20 | 247 | 238 |
| 40  | 408 | 126 | 13  | -10 | 256 | 243 |
| 50  | 276 | 138 | 19  | 0   | 262 | 243 |
| 60  | 114 | 145 | 29  | 10  | 267 | 238 |
| 70  | -77 | 151 | 44  | 20  | 269 | 225 |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

### Fișierul cu rezultate DERIVAR4

```

CALCULE PENTRU DERIVA          „DERIVAR4”
CONSTANTE: ST[m2]= 15  Sd[m2]= 1  v[m/s]= 10  E[m]= .25
L[m]= 1.5  ART[m]= .5  D[m]= 4.5  RO[kg/m3]= 1.225
Sd/ST[-]= 6.666667E-02  L/D[-]= .3333333  Sd*L[m3]= 1.5  L/E[-]= 6
*****
GAMT      DATELE TURBINEI      POZ.DERIVEI      MOMENT INSUMAT
      FTax      FTtg      Mturb      EPS      Mder      DELM
gr      N      N      Nm      gr      Nm      Nm
*****
Unghi al derivei fata de viteza vantului GAMd[gr]= 10
Datele derivei Fperp[N]= 11.94558 Faxd[N]= 19.49314
10      628      -46      -19      0      24      42
20      584      69      4      10      25      21
30      511      107      10      20      27      17
40      408      126      13      30      28      15

```

|    |     |     |    |    |    |     |
|----|-----|-----|----|----|----|-----|
| 50 | 276 | 138 | 19 | 40 | 29 | 10  |
| 60 | 114 | 145 | 29 | 50 | 29 | 1   |
| 70 | -77 | 151 | 44 | 60 | 29 | -14 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 20  
 Datele derivei Fperp[N]= 29.12722 Faxd[N]= 33.98383

|    |     |     |     |     |    |    |
|----|-----|-----|-----|-----|----|----|
| 10 | 628 | -46 | -19 | -10 | 55 | 74 |
| 20 | 584 | 69  | 4   | 0   | 58 | 54 |
| 30 | 511 | 107 | 10  | 10  | 61 | 51 |
| 40 | 408 | 126 | 13  | 20  | 63 | 50 |
| 50 | 276 | 138 | 19  | 30  | 65 | 46 |
| 60 | 114 | 145 | 29  | 40  | 66 | 37 |
| 70 | -77 | 151 | 44  | 50  | 66 | 22 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 30  
 Datele derivei Fperp[N]= 48.9982 Faxd[N]= 42.43477

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -19 | -20 | 89  | 108 |
| 20 | 584 | 69  | 4   | -10 | 94  | 90  |
| 30 | 511 | 107 | 10  | 0   | 98  | 88  |
| 40 | 408 | 126 | 13  | 10  | 101 | 88  |
| 50 | 276 | 138 | 19  | 20  | 104 | 85  |
| 60 | 114 | 145 | 29  | 30  | 105 | 77  |
| 70 | -77 | 151 | 44  | 40  | 106 | 62  |

Unghi al derivei fata de viteza vantului GAMd[gr]= 40  
 Datele derivei Fperp[N]= 69.09471 Faxd[N]= 44.81049

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -19 | -30 | 122 | 141 |
| 20 | 584 | 69  | 4   | -20 | 128 | 124 |
| 30 | 511 | 107 | 10  | -10 | 134 | 124 |
| 40 | 408 | 126 | 13  | 0   | 138 | 125 |
| 50 | 276 | 138 | 19  | 10  | 142 | 123 |
| 60 | 114 | 145 | 29  | 20  | 144 | 115 |
| 70 | -77 | 151 | 44  | 30  | 145 | 101 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 50  
 Datele derivei Fperp[N]= 87.39251 Faxd[N]= 41.8373

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -19 | -40 | 151 | 170 |
| 20 | 584 | 69  | 4   | -30 | 158 | 154 |
| 30 | 511 | 107 | 10  | -20 | 165 | 155 |
| 40 | 408 | 126 | 13  | -10 | 170 | 157 |
| 50 | 276 | 138 | 19  | 0   | 175 | 156 |
| 60 | 114 | 145 | 29  | 10  | 178 | 149 |
| 70 | -77 | 151 | 44  | 20  | 179 | 135 |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

### Fișierul cu rezultate DERIVAR5

```

CALCULE PENTRU DERIVA          „DERIVAR5”
CONSTANTE: ST[m2]= 15   Sd[m2]= .75   v[m/s]= 15   E[m]= .25
L[m]= 1.5   ART[m]= .6   D[m]= 4.5   RO[kg/m3]= 1.225
Sd/ST[-]= .05   L/D[-]= .3333333   Sd*L[m3]= 1.125   L/E[-]= 6
*****
GAMT      DATELE TURBINEI      POZ.DERIVEI      MOMENT INSUMAT
          FTax      FTtg      Mturb      EPS      Mder      DELM
          gr        N        N        Nm        gr        Nm        Nm
*****
Unghi al derivei fata de viteza vantului GAMd[gr]= 10
Datele derivei Fperp[N]= 20.15816 Faxd[N]= 32.89468
  10   1414   -103   -42     0     42     84
  20   1315   155    9     10    46     36
  30   1149   241    22    20    48     27
  40    918   284    30    30    51     21
  50    620   310    43    40    52     10
  60    256   327    65    50    53    -11
  70   -174   340    99    60    53   -45

```

Unghi al derivei fata de viteza vantului GAMd[gr]= 20

Datele derivei Fperp[N]= 49.15218 Faxd[N]= 57.3477

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -10 | 97  | 139 |
| 20 | 1315 | 155  | 9   | 0   | 103 | 94  |
| 30 | 1149 | 241  | 22  | 10  | 109 | 87  |
| 40 | 918  | 284  | 30  | 20  | 113 | 83  |
| 50 | 620  | 310  | 43  | 30  | 116 | 74  |
| 60 | 256  | 327  | 65  | 40  | 118 | 54  |
| 70 | -174 | 340  | 99  | 50  | 119 | 20  |

Unghi al derivei fata de viteza vantului GAMd[gr]= 30

Datele derivei Fperp[N]= 82.68446 Faxd[N]= 71.60868

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -20 | 156 | 198 |
| 20 | 1315 | 155  | 9   | -10 | 165 | 156 |
| 30 | 1149 | 241  | 22  | 0   | 174 | 152 |
| 40 | 918  | 284  | 30  | 10  | 180 | 151 |
| 50 | 620  | 310  | 43  | 20  | 185 | 143 |
| 60 | 256  | 327  | 65  | 30  | 188 | 124 |
| 70 | -174 | 340  | 99  | 40  | 190 | 91  |

Unghi al derivei fata de viteza vantului GAMd[gr]= 40

Datele derivei Fperp[N]= 116.5973 Faxd[N]= 75.6177

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -30 | 213 | 255 |
| 20 | 1315 | 155  | 9   | -20 | 225 | 216 |
| 30 | 1149 | 241  | 22  | -10 | 236 | 214 |
| 40 | 918  | 284  | 30  | 0   | 245 | 215 |
| 50 | 620  | 310  | 43  | 10  | 252 | 209 |
| 60 | 256  | 327  | 65  | 20  | 256 | 192 |
| 70 | -174 | 340  | 99  | 30  | 258 | 160 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 50

Datele derivei Fperp[N]= 147.4749 Faxd[N]= 70.60044

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -40 | 262 | 304 |
| 20 | 1315 | 155  | 9   | -30 | 277 | 267 |
| 30 | 1149 | 241  | 22  | -20 | 290 | 268 |
| 40 | 918  | 284  | 30  | -10 | 301 | 271 |
| 50 | 620  | 310  | 43  | 0   | 310 | 267 |
| 60 | 256  | 327  | 65  | 10  | 316 | 251 |
| 70 | -174 | 340  | 99  | 20  | 319 | 220 |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

## Fișierul cu rezultate DERIVAR6

CALCULE PENTRU DERIVA „DERIVAR6”

CONSTANTE: ST[m2]= 15 Sd[m2]= .75 v[m/s]= 10 E[m]= .25

L[m]= 1.5 ART[m]= .5 D[m]= 4.5 RO[kg/m3]= 1.225

Sd/ST[-]= .05 L/D[-]= .3333333 Sd\*L[m3]= 1.125 L/E[-]= 6

\*\*\*\*\*

GAMT DATELE TURBINEI POZ.DERIVEI MOMENT INSUMAT

|    | FTax | FTtg | Mturb | EPS | Mder | DELM |
|----|------|------|-------|-----|------|------|
| gr | N    | N    | Nm    | gr  | Nm   | Nm   |

\*\*\*\*\*

Unghi al derivei fata de viteza vantului GAMd[gr]= 10

Datele derivei Fperp[N]= 8.959183 Faxd[N]= 14.61986

|    |     |     |     |    |    |     |
|----|-----|-----|-----|----|----|-----|
| 10 | 628 | -46 | -19 | 0  | 18 | 36  |
| 20 | 584 | 69  | 4   | 10 | 19 | 15  |
| 30 | 511 | 107 | 10  | 20 | 20 | 11  |
| 40 | 408 | 126 | 13  | 30 | 21 | 8   |
| 50 | 276 | 138 | 19  | 40 | 22 | 3   |
| 60 | 114 | 145 | 29  | 50 | 22 | -7  |
| 70 | -77 | 151 | 44  | 60 | 22 | -22 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 20

Datele derivei Fperp[N]= 21.84541 Faxd[N]= 25.48787

|    |     |     |     |     |    |    |
|----|-----|-----|-----|-----|----|----|
| 10 | 628 | -46 | -19 | -10 | 41 | 60 |
|----|-----|-----|-----|-----|----|----|

|    |     |     |    |    |    |    |
|----|-----|-----|----|----|----|----|
| 20 | 584 | 69  | 4  | 0  | 44 | 40 |
| 30 | 511 | 107 | 10 | 10 | 46 | 36 |
| 40 | 408 | 126 | 13 | 20 | 47 | 34 |
| 50 | 276 | 138 | 19 | 30 | 49 | 30 |
| 60 | 114 | 145 | 29 | 40 | 49 | 21 |
| 70 | -77 | 151 | 44 | 50 | 50 | 6  |

Unghi al derivei fata de viteza vantului GAMd[gr]= 30  
 Datele derivei Fperp[N]= 36.74865 Faxd[N]= 31.82608

|    |     |     |     |     |    |    |
|----|-----|-----|-----|-----|----|----|
| 10 | 628 | -46 | -19 | -20 | 67 | 86 |
| 20 | 584 | 69  | 4   | -10 | 70 | 66 |
| 30 | 511 | 107 | 10  | 0   | 73 | 64 |
| 40 | 408 | 126 | 13  | 10  | 76 | 63 |
| 50 | 276 | 138 | 19  | 20  | 78 | 59 |
| 60 | 114 | 145 | 29  | 30  | 79 | 50 |
| 70 | -77 | 151 | 44  | 40  | 79 | 36 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 40  
 Datele derivei Fperp[N]= 51.82103 Faxd[N]= 33.60786

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -19 | -30 | 92  | 110 |
| 20 | 584 | 69  | 4   | -20 | 96  | 92  |
| 30 | 511 | 107 | 10  | -10 | 100 | 91  |
| 40 | 408 | 126 | 13  | 0   | 104 | 90  |
| 50 | 276 | 138 | 19  | 10  | 106 | 87  |
| 60 | 114 | 145 | 29  | 20  | 108 | 79  |
| 70 | -77 | 151 | 44  | 30  | 109 | 65  |

Unghi al derivei fata de viteza vantului GAMd[gr]= 50  
 Datele derivei Fperp[N]= 65.54438 Faxd[N]= 31.37797

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -19 | -40 | 113 | 132 |
| 20 | 584 | 69  | 4   | -30 | 119 | 115 |
| 30 | 511 | 107 | 10  | -20 | 124 | 114 |
| 40 | 408 | 126 | 13  | -10 | 128 | 115 |
| 50 | 276 | 138 | 19  | 0   | 131 | 112 |
| 60 | 114 | 145 | 29  | 10  | 133 | 105 |
| 70 | -77 | 151 | 44  | 20  | 134 | 91  |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

### Fișierul cu rezultate DERIVAR7 varianta 1

CALCULE PENTRU DERIVA „DERIVAR7”  
 CONSTANTE: ST[m2]= 15 Sd[m2]= 1.5 v[m/s]= 10 E[m]= .3  
 L[m]= 1.5 ART[m]= .7 D[m]= 4.5 RO[kg/m3]= 1.225  
 Sd/ST[-]= .1 L/D[-]= .3333333 Sd\*L[m3]= 2.25 L/E[-]= 5  
 \*\*\*\*\*

| GAMT | DATELE TURBINEI |      |       | POZ.DERIVEI |      | MOMENT INSUMAT |
|------|-----------------|------|-------|-------------|------|----------------|
| gr   | FTax            | FTtg | Mturb | EPS         | Mder | DELM           |
| N    | N               | Nm   | gr    | Nm          | Nm   |                |
| 10   | 628             | -46  | -21   | 0           | 39   | 60             |
| 20   | 584             | 69   | 8     | 10          | 43   | 35             |
| 30   | 511             | 107  | 15    | 20          | 46   | 31             |
| 40   | 408             | 126  | 20    | 30          | 48   | 28             |
| 50   | 276             | 138  | 26    | 40          | 50   | 24             |
| 60   | 114             | 145  | 36    | 50          | 51   | 15             |
| 70   | -77             | 151  | 51    | 60          | 51   | -0             |

Unghi al derivei fata de viteza vantului GAMd[gr]= 10  
 Datele derivei Fperp[N]= 17.91837 Faxd[N]= 29.23971

|    |     |     |     |    |    |    |
|----|-----|-----|-----|----|----|----|
| 10 | 628 | -46 | -21 | 0  | 39 | 60 |
| 20 | 584 | 69  | 8   | 10 | 43 | 35 |
| 30 | 511 | 107 | 15  | 20 | 46 | 31 |
| 40 | 408 | 126 | 20  | 30 | 48 | 28 |
| 50 | 276 | 138 | 26  | 40 | 50 | 24 |
| 60 | 114 | 145 | 36  | 50 | 51 | 15 |
| 70 | -77 | 151 | 51  | 60 | 51 | -0 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 20  
 Datele derivei Fperp[N]= 43.69083 Faxd[N]= 50.97574

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -21 | -10 | 89  | 110 |
| 20 | 584 | 69  | 8   | 0   | 96  | 89  |
| 30 | 511 | 107 | 15  | 10  | 102 | 87  |
| 40 | 408 | 126 | 20  | 20  | 106 | 87  |

|    |     |     |    |    |     |    |
|----|-----|-----|----|----|-----|----|
| 50 | 276 | 138 | 26 | 30 | 110 | 84 |
| 60 | 114 | 145 | 36 | 40 | 112 | 76 |
| 70 | -77 | 151 | 51 | 50 | 113 | 61 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 30  
 Datele derivei Fperp[N]= 73.4973 Faxd[N]= 63.65216

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -21 | -20 | 143 | 164 |
| 20 | 584 | 69  | 8   | -10 | 153 | 146 |
| 30 | 511 | 107 | 15  | 0   | 162 | 147 |
| 40 | 408 | 126 | 20  | 10  | 169 | 149 |
| 50 | 276 | 138 | 26  | 20  | 174 | 148 |
| 60 | 114 | 145 | 36  | 30  | 177 | 141 |
| 70 | -77 | 151 | 51  | 40  | 178 | 127 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 40  
 Datele derivei Fperp[N]= 103.6421 Faxd[N]= 67.21573

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -21 | -30 | 195 | 216 |
| 20 | 584 | 69  | 8   | -20 | 208 | 200 |
| 30 | 511 | 107 | 15  | -10 | 219 | 204 |
| 40 | 408 | 126 | 20  | 0   | 228 | 208 |
| 50 | 276 | 138 | 26  | 10  | 235 | 209 |
| 60 | 114 | 145 | 36  | 20  | 240 | 204 |
| 70 | -77 | 151 | 51  | 30  | 242 | 190 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 50  
 Datele derivei Fperp[N]= 131.0888 Faxd[N]= 62.75594

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -21 | -40 | 239 | 260 |
| 20 | 584 | 69  | 8   | -30 | 254 | 247 |
| 30 | 511 | 107 | 15  | -20 | 268 | 253 |
| 40 | 408 | 126 | 20  | -10 | 279 | 260 |
| 50 | 276 | 138 | 26  | 0   | 288 | 263 |
| 60 | 114 | 145 | 36  | 10  | 295 | 259 |
| 70 | -77 | 151 | 51  | 20  | 298 | 247 |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

## Pentru Varianta 2 program DERIVAR

### Fișierul cu rezultate DERIVAR1 varianta 2

CALCULE PENTRU DERIVA DERIVAR1  
 CONSTANTE: ST[m2]= 15 Sd[m2]= 4 v[m/s]= 10 E[m]= .8  
 L[m]= 1.5 ART[m]= .5 D[m]= 4.5 RO[kg/m3]= 1.225  
 Sd/ST[-]= .2666667 L/D[-]= .3333333 Sd\*L[m3]= 6 L/E[-]= 1.875  
 \*\*\*\*\*

| GAMT | DATELE TURBINEI |           |             | POZ.DERIVEI |            | MOMENT INSUMAT |
|------|-----------------|-----------|-------------|-------------|------------|----------------|
| gr   | FTax<br>N       | FTtg<br>N | Mturb<br>Nm | EPS<br>gr   | Mder<br>Nm | DELM<br>Nm     |
| 10   | 628             | -46       | -44         | 0           | 96         | 139            |
| 20   | 584             | 69        | 42          | 10          | 102        | 60             |
| 30   | 511             | 107       | 69          | 20          | 107        | 39             |
| 40   | 408             | 126       | 83          | 30          | 112        | 29             |
| 50   | 276             | 138       | 95          | 40          | 115        | 20             |
| 60   | 114             | 145       | 109         | 50          | 117        | 8              |
| 70   | -77             | 151       | 127         | 60          | 117        | -9             |

Unghi al derivei fata de viteza vantului GAMd[gr]= 10  
 Datele derivei Fperp[N]= 47.78231 Faxd[N]= 77.97257

|    |     |     |     |    |     |     |
|----|-----|-----|-----|----|-----|-----|
| 10 | 628 | -46 | -44 | 0  | 96  | 139 |
| 20 | 584 | 69  | 42  | 10 | 102 | 60  |
| 30 | 511 | 107 | 69  | 20 | 107 | 39  |
| 40 | 408 | 126 | 83  | 30 | 112 | 29  |
| 50 | 276 | 138 | 95  | 40 | 115 | 20  |
| 60 | 114 | 145 | 109 | 50 | 117 | 8   |
| 70 | -77 | 151 | 127 | 60 | 117 | -9  |

Unghi al derivei fata de viteza vantului GAMd[gr]= 20  
 Datele derivei Fperp[N]= 116.5089 Faxd[N]= 135.9353

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -44 | -10 | 220 | 264 |
| 20 | 584 | 69  | 42  | 0   | 233 | 191 |
| 30 | 511 | 107 | 69  | 10  | 244 | 175 |

|    |     |     |     |    |     |     |
|----|-----|-----|-----|----|-----|-----|
| 40 | 408 | 126 | 83  | 20 | 253 | 170 |
| 50 | 276 | 138 | 95  | 30 | 259 | 164 |
| 60 | 114 | 145 | 109 | 40 | 263 | 154 |
| 70 | -77 | 151 | 127 | 50 | 264 | 137 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 30  
 Datele derivei Fperp[N]= 195.9928 Faxd[N]= 169.7391

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -44 | -20 | 357 | 401 |
| 20 | 584 | 69  | 42  | -10 | 376 | 334 |
| 30 | 511 | 107 | 69  | 0   | 392 | 323 |
| 40 | 408 | 126 | 83  | 10  | 405 | 323 |
| 50 | 276 | 138 | 95  | 20  | 415 | 320 |
| 60 | 114 | 145 | 109 | 30  | 421 | 313 |
| 70 | -77 | 151 | 127 | 40  | 424 | 297 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 40  
 Datele derivei Fperp[N]= 276.3788 Faxd[N]= 179.242

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -44 | -30 | 489 | 533 |
| 20 | 584 | 69  | 42  | -20 | 514 | 472 |
| 30 | 511 | 107 | 69  | -10 | 535 | 467 |
| 40 | 408 | 126 | 83  | 0   | 553 | 470 |
| 50 | 276 | 138 | 95  | 10  | 566 | 471 |
| 60 | 114 | 145 | 109 | 20  | 575 | 466 |
| 70 | -77 | 151 | 127 | 30  | 579 | 452 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 50  
 Datele derivei Fperp[N]= 349.57 Faxd[N]= 167.3492

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -44 | -40 | 604 | 648 |
| 20 | 584 | 69  | 42  | -30 | 634 | 592 |
| 30 | 511 | 107 | 69  | -20 | 660 | 591 |
| 40 | 408 | 126 | 83  | -10 | 682 | 599 |
| 50 | 276 | 138 | 95  | 0   | 699 | 604 |
| 60 | 114 | 145 | 109 | 10  | 711 | 602 |
| 70 | -77 | 151 | 127 | 20  | 717 | 590 |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

### Fișierul cu rezultate DERIVAR2 varianta 2

CALCULE PENTRU DERIVA DERIVAR2  
 CONSTANTE: ST[m2]= 15 Sd[m2]= 6.6 v[m/s]= 10 E[m]= .8  
 L[m]= 2 ART[m]= .5 D[m]= 4.5 RO[kg/m3]= 1.225  
 Sd/ST[-]= .44 L/D[-]= .4444444 Sd\*L[m3]= 13.2 L/E[-]= 2.5  
 \*\*\*\*\*

| GAMT  | DATELE TURBINEI |       |       | POZ.DERIVEI |       | MOMENT INSUMAT |
|-------|-----------------|-------|-------|-------------|-------|----------------|
|       | FTax            | FTtg  | Mturb | EPS         | Mder  | DELM           |
|       | gr              | N     | Nm    | gr          | Nm    | Nm             |
| ***** | *****           | ***** | ***** | *****       | ***** | *****          |

Unghi al derivei fata de viteza vantului GAMd[gr]= 10  
 Datele derivei Fperp[N]= 78.84081 Faxd[N]= 128.6547

|    |     |     |     |    |     |     |
|----|-----|-----|-----|----|-----|-----|
| 10 | 628 | -46 | -44 | 0  | 197 | 241 |
| 20 | 584 | 69  | 42  | 10 | 208 | 166 |
| 30 | 511 | 107 | 69  | 20 | 217 | 148 |
| 40 | 408 | 126 | 83  | 30 | 224 | 141 |
| 50 | 276 | 138 | 95  | 40 | 229 | 134 |
| 60 | 114 | 145 | 109 | 50 | 232 | 124 |
| 70 | -77 | 151 | 127 | 60 | 233 | 106 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 20  
 Datele derivei Fperp[N]= 192.2396 Faxd[N]= 224.2932

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -44 | -10 | 460 | 503 |
| 20 | 584 | 69  | 42  | 0   | 481 | 439 |
| 30 | 511 | 107 | 69  | 10  | 499 | 430 |
| 40 | 408 | 126 | 83  | 20  | 513 | 430 |
| 50 | 276 | 138 | 95  | 30  | 524 | 429 |
| 60 | 114 | 145 | 109 | 40  | 530 | 422 |



|   |     |     |     |     |      |      |
|---|-----|-----|-----|-----|------|------|
| 70  | -77 | 151 | 127 | 50  | 532  | 405  |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 30 |     |     |     |     |      |      |
| Datele derivei Fperp[N]= 323.3881 Faxd[N]= 280.0695   |     |     |     |     |      |      |
| 10  | 628 | -46 | -44 | -20 | 751  | 795  |
| 20  | 584 | 69  | 42  | -10 | 782  | 740  |
| 30  | 511 | 107 | 69  | 0   | 808  | 740  |
| 40  | 408 | 126 | 83  | 10  | 830  | 748  |
| 50  | 276 | 138 | 95  | 20  | 847  | 752  |
| 60  | 114 | 145 | 109 | 30  | 857  | 748  |
| 70  | -77 | 151 | 127 | 40  | 861  | 734  |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 40 |     |     |     |     |      |      |
| Datele derivei Fperp[N]= 456.0251 Faxd[N]= 295.7492   |     |     |     |     |      |      |
| 10  | 628 | -46 | -44 | -30 | 1036 | 1079 |
| 20  | 584 | 69  | 42  | -20 | 1076 | 1034 |
| 30  | 511 | 107 | 69  | -10 | 1111 | 1042 |
| 40  | 408 | 126 | 83  | 0   | 1140 | 1057 |
| 50  | 276 | 138 | 95  | 10  | 1162 | 1068 |
| 60  | 114 | 145 | 109 | 20  | 1177 | 1068 |
| 70  | -77 | 151 | 127 | 30  | 1183 | 1057 |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 50 |     |     |     |     |      |      |
| Datele derivei Fperp[N]= 576.7905 Faxd[N]= 276.1261   |     |     |     |     |      |      |
| 10  | 628 | -46 | -44 | -40 | 1286 | 1330 |
| 20  | 584 | 69  | 42  | -30 | 1334 | 1292 |
| 30  | 511 | 107 | 69  | -20 | 1377 | 1309 |
| 40  | 408 | 126 | 83  | -10 | 1414 | 1331 |
| 50  | 276 | 138 | 95  | 0   | 1442 | 1347 |
| 60  | 114 | 145 | 109 | 10  | 1462 | 1353 |
| 70  | -77 | 151 | 127 | 20  | 1472 | 1345 |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

## Fișierul cu rezultate DERIVAR3 varianta 2

CALCULE PENTRU DERIVA

„DERIVAR3”

CONSTANTE: ST[m2]= 15 Sd[m2]= 1.5 v[m/s]= 10 E[m]= .25  
 L[m]= 1.5 ART[m]= .5 D[m]= 4.5 RO[kg/m3]= 1.225  
 Sd/ST[-]= .1 L/D[-]= .3333333 Sd\*L[m3]= 2.25 L/E[-]= 6

\*\*\*\*\*

| GAMT<br>gr | DATELE TURBINEI |      |       | POZ.DERIVEI |      | MOMENT INSUMAT |
|------------|-----------------|------|-------|-------------|------|----------------|
|            | FTax            | FTtg | Mturb | EPS         | Mder | DELM           |
|            | N               | N    | Nm    | gr          | Nm   | Nm             |

\*\*\*\*\*

Unghi al derivei fata de viteza vantului GAMd[gr]= 10  
 Datele derivei Fperp[N]= 17.91837 Faxd[N]= 29.23971

|    |     |     |     |    |    |    |
|----|-----|-----|-----|----|----|----|
| 10 | 628 | -46 | -19 | 0  | 36 | 54 |
| 20 | 584 | 69  | 4   | 10 | 38 | 34 |
| 30 | 511 | 107 | 10  | 20 | 40 | 31 |
| 40 | 408 | 126 | 13  | 30 | 42 | 29 |
| 50 | 276 | 138 | 19  | 40 | 43 | 24 |
| 60 | 114 | 145 | 29  | 50 | 44 | 15 |
| 70 | -77 | 151 | 44  | 60 | 44 | 0  |

Unghi al derivei fata de viteza vantului GAMd[gr]= 20  
 Datele derivei Fperp[N]= 43.69083 Faxd[N]= 50.97574

|    |     |     |     |     |    |     |
|----|-----|-----|-----|-----|----|-----|
| 10 | 628 | -46 | -19 | -10 | 83 | 101 |
| 20 | 584 | 69  | 4   | 0   | 87 | 83  |
| 30 | 511 | 107 | 10  | 10  | 91 | 82  |
| 40 | 408 | 126 | 13  | 20  | 95 | 82  |
| 50 | 276 | 138 | 19  | 30  | 97 | 78  |
| 60 | 114 | 145 | 29  | 40  | 99 | 70  |

|   |     |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|-----|
| 70  | -77 | 151 | 44  | 50  | 99  | 55  |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 30 |     |     |     |     |     |     |
| Datele derivei Fperp[N]= 73.4973 Faxd[N]= 63.65216    |     |     |     |     |     |     |
| 10  | 628 | -46 | -19 | -20 | 134 | 152 |
| 20  | 584 | 69  | 4   | -10 | 141 | 137 |
| 30  | 511 | 107 | 10  | 0   | 147 | 137 |
| 40  | 408 | 126 | 13  | 10  | 152 | 139 |
| 50  | 276 | 138 | 19  | 20  | 156 | 137 |
| 60  | 114 | 145 | 29  | 30  | 158 | 129 |
| 70  | -77 | 151 | 44  | 40  | 159 | 115 |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 40 |     |     |     |     |     |     |
| Datele derivei Fperp[N]= 103.6421 Faxd[N]= 67.21573   |     |     |     |     |     |     |
| 10  | 628 | -46 | -19 | -30 | 184 | 202 |
| 20  | 584 | 69  | 4   | -20 | 193 | 189 |
| 30  | 511 | 107 | 10  | -10 | 201 | 191 |
| 40  | 408 | 126 | 13  | 0   | 207 | 194 |
| 50  | 276 | 138 | 19  | 10  | 212 | 193 |
| 60  | 114 | 145 | 29  | 20  | 216 | 187 |
| 70  | -77 | 151 | 44  | 30  | 217 | 173 |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 50 |     |     |     |     |     |     |
| Datele derivei Fperp[N]= 131.0888 Faxd[N]= 62.75594   |     |     |     |     |     |     |
| 10  | 628 | -46 | -19 | -40 | 227 | 245 |
| 20  | 584 | 69  | 4   | -30 | 238 | 234 |
| 30  | 511 | 107 | 10  | -20 | 247 | 238 |
| 40  | 408 | 126 | 13  | -10 | 256 | 243 |
| 50  | 276 | 138 | 19  | 0   | 262 | 243 |
| 60  | 114 | 145 | 29  | 10  | 267 | 238 |
| 70  | -77 | 151 | 44  | 20  | 269 | 225 |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

## Fișierul cu rezultate DERIVAR4 varianta 2

CALCULE PENTRU DERIVA „DERIVAR4”

CONSTANTE: ST[m2]= 15 Sd[m2]= 1 v[m/s]= 10 E[m]= .25  
L[m]= 1.5 ART[m]= .5 D[m]= 4.5 RO[kg/m3]= 1.225  
Sd/ST[-]= 6.666667E-02 L/D[-]= .3333333 Sd\*L[m3]= 1.5 L/E[-]= 6  
\*\*\*\*\*

| GAMT<br>gr  | DATELE TURBINEI |      |       | POZ.DERIVEI |      | MOMENT INSUMAT |
|---|-----------------|------|-------|-------------|------|----------------|
|   | FTax            | FTtg | Mturb | EPS         | Mder | DELM           |
|   | N               | N    | Nm    | gr          | Nm   | Nm             |
| *****   |                 |      |       |             |      |                |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 10 |                 |      |       |             |      |                |
| Datele derivei Fperp[N]= 11.94558 Faxd[N]= 19.49314   |                 |      |       |             |      |                |
| 10  | 628             | -46  | -19   | 0           | 24   | 42             |
| 20  | 584             | 69   | 4     | 10          | 25   | 21             |
| 30  | 511             | 107  | 10    | 20          | 27   | 17             |
| 40  | 408             | 126  | 13    | 30          | 28   | 15             |
| 50  | 276             | 138  | 19    | 40          | 29   | 10             |
| 60  | 114             | 145  | 29    | 50          | 29   | 1              |
| 70  | -77             | 151  | 44    | 60          | 29   | -14            |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 20 |                 |      |       |             |      |                |
| Datele derivei Fperp[N]= 29.12722 Faxd[N]= 33.98383   |                 |      |       |             |      |                |
| 10  | 628             | -46  | -19   | -10         | 55   | 74             |
| 20  | 584             | 69   | 4     | 0           | 58   | 54             |
| 30  | 511             | 107  | 10    | 10          | 61   | 51             |
| 40  | 408             | 126  | 13    | 20          | 63   | 50             |
| 50  | 276             | 138  | 19    | 30          | 65   | 46             |
| 60  | 114             | 145  | 29    | 40          | 66   | 37             |
| 70  | -77             | 151  | 44    | 50          | 66   | 22             |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 30 |                 |      |       |             |      |                |

Datele derivei Fperp[N]= 48.9982 Faxd[N]= 42.43477

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -19 | -20 | 89  | 108 |
| 20 | 584 | 69  | 4   | -10 | 94  | 90  |
| 30 | 511 | 107 | 10  | 0   | 98  | 88  |
| 40 | 408 | 126 | 13  | 10  | 101 | 88  |
| 50 | 276 | 138 | 19  | 20  | 104 | 85  |
| 60 | 114 | 145 | 29  | 30  | 105 | 77  |
| 70 | -77 | 151 | 44  | 40  | 106 | 62  |

Unghi al derivei fata de viteza vantului GAMd[gr]= 40

Datele derivei Fperp[N]= 69.09471 Faxd[N]= 44.81049

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -19 | -30 | 122 | 141 |
| 20 | 584 | 69  | 4   | -20 | 128 | 124 |
| 30 | 511 | 107 | 10  | -10 | 134 | 124 |
| 40 | 408 | 126 | 13  | 0   | 138 | 125 |
| 50 | 276 | 138 | 19  | 10  | 142 | 123 |
| 60 | 114 | 145 | 29  | 20  | 144 | 115 |
| 70 | -77 | 151 | 44  | 30  | 145 | 101 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 50

Datele derivei Fperp[N]= 87.39251 Faxd[N]= 41.8373

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -19 | -40 | 151 | 170 |
| 20 | 584 | 69  | 4   | -30 | 158 | 154 |
| 30 | 511 | 107 | 10  | -20 | 165 | 155 |
| 40 | 408 | 126 | 13  | -10 | 170 | 157 |
| 50 | 276 | 138 | 19  | 0   | 175 | 156 |
| 60 | 114 | 145 | 29  | 10  | 178 | 149 |
| 70 | -77 | 151 | 44  | 20  | 179 | 135 |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

## Fișierul cu rezultate DERIVAR5 varianta 2

CALCULE PENTRU DERIVA „DERIVAR5”

CONSTANTE: ST[m2]= 15 Sd[m2]= .75 v[m/s]= 15 E[m]= .25  
L[m]= 1.5 ART[m]= .6 D[m]= 4.5 RO[kg/m3]= 1.225  
Sd/ST[-]= .05 L/D[-]= .3333333 Sd\*L[m3]= 1.125 L/E[-]= 6  
\*\*\*\*\*

| GAMT | DATELE TURBINEI |      |       | POZ.DERIVEI |      | MOMENT INSUMAT |
|------|-----------------|------|-------|-------------|------|----------------|
|      | FTax            | FTtg | Mturb | EPS         | Mder | DELM           |
| gr   | N               | N    | Nm    | gr          | Nm   | Nm             |

\*\*\*\*\*

Unghi al derivei fata de viteza vantului GAMd[gr]= 10

Datele derivei Fperp[N]= 20.15816 Faxd[N]= 32.89468

|    |      |      |     |    |    |     |
|----|------|------|-----|----|----|-----|
| 10 | 1414 | -103 | -42 | 0  | 42 | 84  |
| 20 | 1315 | 155  | 9   | 10 | 46 | 36  |
| 30 | 1149 | 241  | 22  | 20 | 48 | 27  |
| 40 | 918  | 284  | 30  | 30 | 51 | 21  |
| 50 | 620  | 310  | 43  | 40 | 52 | 10  |
| 60 | 256  | 327  | 65  | 50 | 53 | -11 |
| 70 | -174 | 340  | 99  | 60 | 53 | -45 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 20

Datele derivei Fperp[N]= 49.15218 Faxd[N]= 57.3477

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -10 | 97  | 139 |
| 20 | 1315 | 155  | 9   | 0   | 103 | 94  |
| 30 | 1149 | 241  | 22  | 10  | 109 | 87  |
| 40 | 918  | 284  | 30  | 20  | 113 | 83  |
| 50 | 620  | 310  | 43  | 30  | 116 | 74  |
| 60 | 256  | 327  | 65  | 40  | 118 | 54  |
| 70 | -174 | 340  | 99  | 50  | 119 | 20  |

Unghi al derivei fata de viteza vantului GAMd[gr]= 30

Datele derivei Fperp[N]= 82.68446 Faxd[N]= 71.60868

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -20 | 156 | 198 |
| 20 | 1315 | 155  | 9   | -10 | 165 | 156 |
| 30 | 1149 | 241  | 22  | 0   | 174 | 152 |
| 40 | 918  | 284  | 30  | 10  | 180 | 151 |
| 50 | 620  | 310  | 43  | 20  | 185 | 143 |
| 60 | 256  | 327  | 65  | 30  | 188 | 124 |
| 70 | -174 | 340  | 99  | 40  | 190 | 91  |

Unghi al derivei fata de viteza vantului GAMd[gr]= 40  
 Datele derivei Fperp[N]= 116.5973 Faxd[N]= 75.6177

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -30 | 213 | 255 |
| 20 | 1315 | 155  | 9   | -20 | 225 | 216 |
| 30 | 1149 | 241  | 22  | -10 | 236 | 214 |
| 40 | 918  | 284  | 30  | 0   | 245 | 215 |
| 50 | 620  | 310  | 43  | 10  | 252 | 209 |
| 60 | 256  | 327  | 65  | 20  | 256 | 192 |
| 70 | -174 | 340  | 99  | 30  | 258 | 160 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 50  
 Datele derivei Fperp[N]= 147.4749 Faxd[N]= 70.60044

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -40 | 262 | 304 |
| 20 | 1315 | 155  | 9   | -30 | 277 | 267 |
| 30 | 1149 | 241  | 22  | -20 | 290 | 268 |
| 40 | 918  | 284  | 30  | -10 | 301 | 271 |
| 50 | 620  | 310  | 43  | 0   | 310 | 267 |
| 60 | 256  | 327  | 65  | 10  | 316 | 251 |
| 70 | -174 | 340  | 99  | 20  | 319 | 220 |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

## Fișierul cu rezultate DERIVAR6 varianta 2

CALCULE PENTRU DERIVA "DERIVAR6"

CONSTANTE: ST[m2]= 15 Sd[m2]= .75 v[m/s]= 10 E[m]= .25  
 L[m]= 1.5 ART[m]= .5 D[m]= 4.5 RO[kg/m3]= 1.225  
 Sd/ST[-]= .05 L/D[-]= .3333333 Sd\*L[m3]= 1.125 L/E[-]= 6  
 \*\*\*\*\*

| GAMT | DATELE TURBINEI |      |       | POZ.DERIVEI |      | MOMENT INSUMAT |
|------|-----------------|------|-------|-------------|------|----------------|
|      | FTax            | FTtg | Mturb | EPS         | Mder | DELM           |
| gr   | N               | N    | Nm    | gr          | Nm   | Nm             |
| 10   | 628             | -46  | -19   | 0           | 18   | 36             |
| 20   | 584             | 69   | 4     | 10          | 19   | 15             |
| 30   | 511             | 107  | 10    | 20          | 20   | 11             |
| 40   | 408             | 126  | 13    | 30          | 21   | 8              |
| 50   | 276             | 138  | 19    | 40          | 22   | 3              |
| 60   | 114             | 145  | 29    | 50          | 22   | -7             |
| 70   | -77             | 151  | 44    | 60          | 22   | -22            |

Unghi al derivei fata de viteza vantului GAMd[gr]= 10  
 Datele derivei Fperp[N]= 8.959183 Faxd[N]= 14.61986

|    |     |     |     |     |    |    |
|----|-----|-----|-----|-----|----|----|
| 10 | 628 | -46 | -19 | -10 | 41 | 60 |
| 20 | 584 | 69  | 4   | 0   | 44 | 40 |
| 30 | 511 | 107 | 10  | 10  | 46 | 36 |
| 40 | 408 | 126 | 13  | 20  | 47 | 34 |
| 50 | 276 | 138 | 19  | 30  | 49 | 30 |
| 60 | 114 | 145 | 29  | 40  | 49 | 21 |
| 70 | -77 | 151 | 44  | 50  | 50 | 6  |

Unghi al derivei fata de viteza vantului GAMd[gr]= 20  
 Datele derivei Fperp[N]= 21.84541 Faxd[N]= 25.48787

|    |     |     |     |     |    |    |
|----|-----|-----|-----|-----|----|----|
| 10 | 628 | -46 | -19 | -20 | 67 | 86 |
|----|-----|-----|-----|-----|----|----|

Unghi al derivei fata de viteza vantului GAMd[gr]= 30  
 Datele derivei Fperp[N]= 36.74865 Faxd[N]= 31.82608

|    |     |     |     |     |    |    |
|----|-----|-----|-----|-----|----|----|
| 10 | 628 | -46 | -19 | -20 | 67 | 86 |
|----|-----|-----|-----|-----|----|----|

|    |     |     |    |     |    |    |
|----|-----|-----|----|-----|----|----|
| 20 | 584 | 69  | 4  | -10 | 70 | 66 |
| 30 | 511 | 107 | 10 | 0   | 73 | 64 |
| 40 | 408 | 126 | 13 | 10  | 76 | 63 |
| 50 | 276 | 138 | 19 | 20  | 78 | 59 |
| 60 | 114 | 145 | 29 | 30  | 79 | 50 |
| 70 | -77 | 151 | 44 | 40  | 79 | 36 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 40  
 Datele derivei Fperp[N]= 51.82103 Faxd[N]= 33.60786

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -19 | -30 | 92  | 110 |
| 20 | 584 | 69  | 4   | -20 | 96  | 92  |
| 30 | 511 | 107 | 10  | -10 | 100 | 91  |
| 40 | 408 | 126 | 13  | 0   | 104 | 90  |
| 50 | 276 | 138 | 19  | 10  | 106 | 87  |
| 60 | 114 | 145 | 29  | 20  | 108 | 79  |
| 70 | -77 | 151 | 44  | 30  | 109 | 65  |

Unghi al derivei fata de viteza vantului GAMd[gr]= 50  
 Datele derivei Fperp[N]= 65.54438 Faxd[N]= 31.37797

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -19 | -40 | 113 | 132 |
| 20 | 584 | 69  | 4   | -30 | 119 | 115 |
| 30 | 511 | 107 | 10  | -20 | 124 | 114 |
| 40 | 408 | 126 | 13  | -10 | 128 | 115 |
| 50 | 276 | 138 | 19  | 0   | 131 | 112 |
| 60 | 114 | 145 | 29  | 10  | 133 | 105 |
| 70 | -77 | 151 | 44  | 20  | 134 | 91  |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

## Fișierul cu rezultate DERIVAR7 varianta 2

CALCULE PENTRU DERIVA „DERIVAR7”

CONSTANTE: ST[m2]= 15 Sd[m2]= 1.5 v[m/s]= 10 E[m]= .3  
 L[m]= 1.5 ART[m]= .7 D[m]= 4.5 RO[kg/m3]= 1.225  
 Sd/ST[-]= .1 L/D[-]= .3333333 Sd\*L[m3]= 2.25 L/E[-]= 5  
 \*\*\*\*\*

| GAMT | DATELE TURBINEI |           |             | POZ.DERIVEI |            | MOMENT INSUMAT |
|------|-----------------|-----------|-------------|-------------|------------|----------------|
| gr   | FTax<br>N       | FTtg<br>N | Mturb<br>Nm | EPS<br>gr   | Mder<br>Nm | DELM<br>Nm     |
| 10   | 628             | -46       | -21         | 0           | 39         | 60             |
| 20   | 584             | 69        | 8           | 10          | 43         | 35             |
| 30   | 511             | 107       | 15          | 20          | 46         | 31             |
| 40   | 408             | 126       | 20          | 30          | 48         | 28             |
| 50   | 276             | 138       | 26          | 40          | 50         | 24             |
| 60   | 114             | 145       | 36          | 50          | 51         | 15             |
| 70   | -77             | 151       | 51          | 60          | 51         | -0             |

Unghi al derivei fata de viteza vantului GAMd[gr]= 10  
 Datele derivei Fperp[N]= 17.91837 Faxd[N]= 29.23971

|    |     |     |     |    |    |    |
|----|-----|-----|-----|----|----|----|
| 10 | 628 | -46 | -21 | 0  | 39 | 60 |
| 20 | 584 | 69  | 8   | 10 | 43 | 35 |
| 30 | 511 | 107 | 15  | 20 | 46 | 31 |
| 40 | 408 | 126 | 20  | 30 | 48 | 28 |
| 50 | 276 | 138 | 26  | 40 | 50 | 24 |
| 60 | 114 | 145 | 36  | 50 | 51 | 15 |
| 70 | -77 | 151 | 51  | 60 | 51 | -0 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 20  
 Datele derivei Fperp[N]= 43.69083 Faxd[N]= 50.97574

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -21 | -10 | 89  | 110 |
| 20 | 584 | 69  | 8   | 0   | 96  | 89  |
| 30 | 511 | 107 | 15  | 10  | 102 | 87  |
| 40 | 408 | 126 | 20  | 20  | 106 | 87  |
| 50 | 276 | 138 | 26  | 30  | 110 | 84  |
| 60 | 114 | 145 | 36  | 40  | 112 | 76  |
| 70 | -77 | 151 | 51  | 50  | 113 | 61  |

Unghi al derivei fata de viteza vantului GAMd[gr]= 30  
 Datele derivei Fperp[N]= 73.4973 Faxd[N]= 63.65216

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -21 | -20 | 143 | 164 |
| 20 | 584 | 69  | 8   | -10 | 153 | 146 |

|    |     |     |    |    |     |     |
|----|-----|-----|----|----|-----|-----|
| 30 | 511 | 107 | 15 | 0  | 162 | 147 |
| 40 | 408 | 126 | 20 | 10 | 169 | 149 |
| 50 | 276 | 138 | 26 | 20 | 174 | 148 |
| 60 | 114 | 145 | 36 | 30 | 177 | 141 |
| 70 | -77 | 151 | 51 | 40 | 178 | 127 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 40  
 Datele derivei Fperp[N]= 103.6421 Faxd[N]= 67.21573

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -21 | -30 | 195 | 216 |
| 20 | 584 | 69  | 8   | -20 | 208 | 200 |
| 30 | 511 | 107 | 15  | -10 | 219 | 204 |
| 40 | 408 | 126 | 20  | 0   | 228 | 208 |
| 50 | 276 | 138 | 26  | 10  | 235 | 209 |
| 60 | 114 | 145 | 36  | 20  | 240 | 204 |
| 70 | -77 | 151 | 51  | 30  | 242 | 190 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 50  
 Datele derivei Fperp[N]= 131.0888 Faxd[N]= 62.75594

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -21 | -40 | 239 | 260 |
| 20 | 584 | 69  | 8   | -30 | 254 | 247 |
| 30 | 511 | 107 | 15  | -20 | 268 | 253 |
| 40 | 408 | 126 | 20  | -10 | 279 | 260 |
| 50 | 276 | 138 | 26  | 0   | 288 | 263 |
| 60 | 114 | 145 | 36  | 10  | 295 | 259 |
| 70 | -77 | 151 | 51  | 20  | 298 | 247 |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

## Fișierul cu rezultate DERIVF1 varianta 2

CALCULE PENTRU DERIVA derivf1  
 CONSTANTE: ST[m2]= 15 Sd[m2]= 3 v[m/s]= 15 E[m]= .25  
 L[m]= 1.6 ART[m]= .25 D[m]= 4.5 RO[kg/m3]= 1.225  
 Sd/ST[-]= .2 L/D[-]= .3555556 Sd\*L[m3]= 4.8 L/E[-]= 6.4  
 \*\*\*\*\*

| GAMT  | DATELE TURBINEI |      |       | POZ.DERIVEI |      | MOMENT INSUMAT |
|-------|-----------------|------|-------|-------------|------|----------------|
|       | FTax            | FTtg | Mturb | EPS         | Mder | DELM           |
|       | gr              | N    | Nm    | gr          | Nm   | Nm             |
| ***** |                 |      |       |             |      |                |

Unghi al derivei fata de viteza vantului GAMd[gr]= 10  
 Datele derivei Fperp[N]= 80.63264 Faxd[N]= 131.5787

|    |      |      |     |    |     |     |
|----|------|------|-----|----|-----|-----|
| 10 | 1414 | -103 | -42 | 0  | 149 | 191 |
| 20 | 1315 | 155  | 9   | 10 | 155 | 145 |
| 30 | 1149 | 241  | 22  | 20 | 159 | 138 |
| 40 | 918  | 284  | 30  | 30 | 163 | 133 |
| 50 | 620  | 310  | 43  | 40 | 166 | 123 |
| 60 | 256  | 327  | 65  | 50 | 167 | 103 |
| 70 | -174 | 340  | 99  | 60 | 168 | 69  |

Unghi al derivei fata de viteza vantului GAMd[gr]= 20  
 Datele derivei Fperp[N]= 196.6087 Faxd[N]= 229.3908

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -10 | 353 | 395 |
| 20 | 1315 | 155  | 9   | 0   | 364 | 355 |
| 30 | 1149 | 241  | 22  | 10  | 373 | 351 |
| 40 | 918  | 284  | 30  | 20  | 380 | 351 |
| 50 | 620  | 310  | 43  | 30  | 386 | 343 |
| 60 | 256  | 327  | 65  | 40  | 389 | 325 |
| 70 | -174 | 340  | 99  | 50  | 390 | 292 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 30  
 Datele derivei Fperp[N]= 330.7379 Faxd[N]= 286.4347

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -20 | 582 | 624 |
| 20 | 1315 | 155  | 9   | -10 | 598 | 589 |

|    |      |     |    |    |     |     |
|----|------|-----|----|----|-----|-----|
| 30 | 1149 | 241 | 22 | 0  | 612 | 590 |
| 40 | 918  | 284 | 30 | 10 | 623 | 593 |
| 50 | 620  | 310 | 43 | 20 | 631 | 589 |
| 60 | 256  | 327 | 65 | 30 | 637 | 572 |
| 70 | -174 | 340 | 99 | 40 | 639 | 540 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 40  
 Datele derivei Fperp[N]= 466.3893 Faxd[N]= 302.4708

|    |      |      |     |     |     |     |
|----|------|------|-----|-----|-----|-----|
| 10 | 1414 | -103 | -42 | -30 | 809 | 851 |
| 20 | 1315 | 155  | 9   | -20 | 830 | 821 |
| 30 | 1149 | 241  | 22  | -10 | 848 | 826 |
| 40 | 918  | 284  | 30  | 0   | 863 | 833 |
| 50 | 620  | 310  | 43  | 10  | 874 | 832 |
| 60 | 256  | 327  | 65  | 20  | 882 | 817 |
| 70 | -174 | 340  | 99  | 30  | 885 | 786 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 50  
 Datele derivei Fperp[N]= 589.8995 Faxd[N]= 282.4018

|    |      |      |     |     |      |      |
|----|------|------|-----|-----|------|------|
| 10 | 1414 | -103 | -42 | -40 | 1011 | 1053 |
| 20 | 1315 | 155  | 9   | -30 | 1036 | 1027 |
| 30 | 1149 | 241  | 22  | -20 | 1058 | 1037 |
| 40 | 918  | 284  | 30  | -10 | 1077 | 1047 |
| 50 | 620  | 310  | 43  | 0   | 1091 | 1049 |
| 60 | 256  | 327  | 65  | 10  | 1101 | 1037 |
| 70 | -174 | 340  | 99  | 20  | 1107 | 1008 |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului

## Fișierul cu rezultate DERIVF2 varianta 2

CALCULE PENTRU DERIVA derivf2  
 CONSTANTE: ST[m2]= 15 Sd[m2]= 3 v[m/s]= 10 E[m]= .25  
 L[m]= 1.6 ART[m]= .25 D[m]= 4.5 RO[kg/m3]= 1.225  
 Sd/ST[-]= .2 L/D[-]= .3555556 Sd\*L[m3]= 4.8 L/E[-]= 6.4  
 \*\*\*\*\*

| GAMT  | DATELE TURBINEI |      |       | POZ.DERVEI |      | MOMENT INSUMAT |
|-------|-----------------|------|-------|------------|------|----------------|
|       | FTax            | FTtg | Mturb | EPS        | Mder | DELM           |
|       | gr              | N    | Nm    | gr         | Nm   | Nm             |
| ***** |                 |      |       |            |      |                |

Unghi al derivei fata de viteza vantului GAMd[gr]= 10  
 Datele derivei Fperp[N]= 35.83673 Faxd[N]= 58.47943

|    |     |     |     |    |    |    |
|----|-----|-----|-----|----|----|----|
| 10 | 628 | -46 | -19 | 0  | 66 | 85 |
| 20 | 584 | 69  | 4   | 10 | 69 | 65 |
| 30 | 511 | 107 | 10  | 20 | 71 | 61 |
| 40 | 408 | 126 | 13  | 30 | 72 | 59 |
| 50 | 276 | 138 | 19  | 40 | 74 | 55 |
| 60 | 114 | 145 | 29  | 50 | 74 | 46 |
| 70 | -77 | 151 | 44  | 60 | 74 | 31 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 20  
 Datele derivei Fperp[N]= 87.38165 Faxd[N]= 101.9515

|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -19 | -10 | 157 | 175 |
| 20 | 584 | 69  | 4   | 0   | 162 | 158 |
| 30 | 511 | 107 | 10  | 10  | 166 | 156 |
| 40 | 408 | 126 | 13  | 20  | 169 | 156 |
| 50 | 276 | 138 | 19  | 30  | 171 | 153 |
| 60 | 114 | 145 | 29  | 40  | 173 | 144 |
| 70 | -77 | 151 | 44  | 50  | 173 | 130 |

Unghi al derivei fata de viteza vantului GAMd[gr]= 30  
 Datele derivei Fperp[N]= 146.9946 Faxd[N]= 127.3043

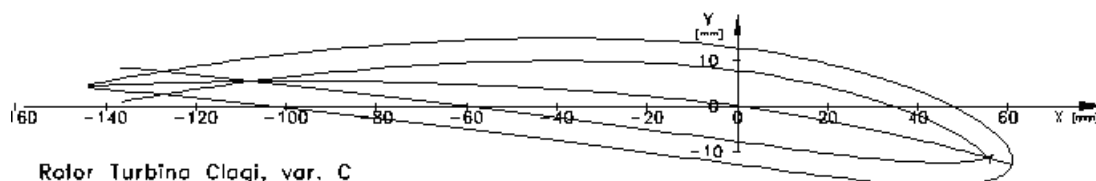
|    |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|
| 10 | 628 | -46 | -19 | -20 | 259 | 277 |
| 20 | 584 | 69  | 4   | -10 | 266 | 262 |

|   |     |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|-----|
| 30  | 511 | 107 | 10  | 0   | 272 | 262 |
| 40  | 408 | 126 | 13  | 10  | 277 | 264 |
| 50  | 276 | 138 | 19  | 20  | 281 | 262 |
| 60  | 114 | 145 | 29  | 30  | 283 | 254 |
| 70  | -77 | 151 | 44  | 40  | 284 | 240 |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 40 |     |     |     |     |     |     |
| Datele derivei Fperp[N]= 207.2841 Faxd[N]= 134.4315   |     |     |     |     |     |     |
| 10  | 628 | -46 | -19 | -30 | 360 | 378 |
| 20  | 584 | 69  | 4   | -20 | 369 | 365 |
| 30  | 511 | 107 | 10  | -10 | 377 | 367 |
| 40  | 408 | 126 | 13  | 0   | 383 | 370 |
| 50  | 276 | 138 | 19  | 10  | 389 | 370 |
| 60  | 114 | 145 | 29  | 20  | 392 | 363 |
| 70  | -77 | 151 | 44  | 30  | 393 | 350 |
| Unghi al derivei fata de viteza vantului GAMd[gr]= 50 |     |     |     |     |     |     |
| Datele derivei Fperp[N]= 262.1775 Faxd[N]= 125.5119   |     |     |     |     |     |     |
| 10  | 628 | -46 | -19 | -40 | 450 | 468 |
| 20  | 584 | 69  | 4   | -30 | 461 | 456 |
| 30  | 511 | 107 | 10  | -20 | 470 | 461 |
| 40  | 408 | 126 | 13  | -10 | 479 | 465 |
| 50  | 276 | 138 | 19  | 0   | 485 | 466 |
| 60  | 114 | 145 | 29  | 10  | 489 | 461 |
| 70  | -77 | 151 | 44  | 20  | 492 | 448 |

OBSERVATIE:Valori negative ale pozitiei derivei(EPS) insemneaza ca deriva este deplasata contra vantului



## 4. SECȚIUNI PRIN PALETA ROTORICĂ

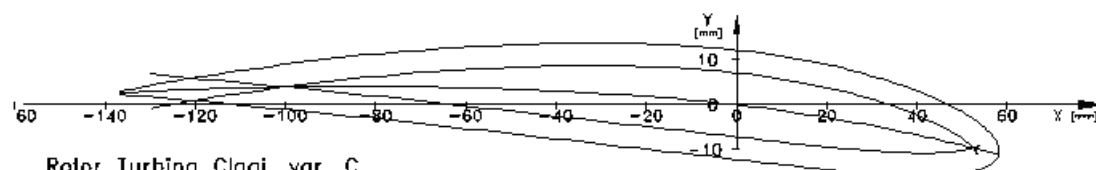


Rotor Turbina Clagi, var. C

Profilul NACA-44124, Cod\_fis:PR

Secțiunea Nr. P1

Raza sect=2200.00 mm

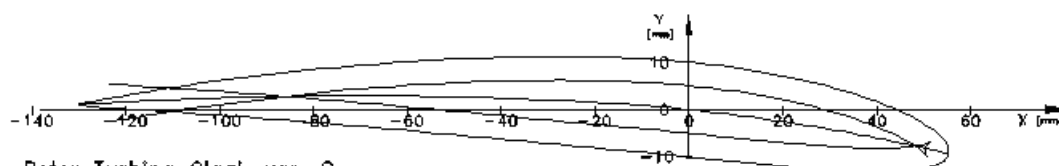


Rotor Turbina Clagi, var. C

Profilul NACA-34117, Cod\_fis:PR

Secțiunea Nr. P2

Raza sect=2207.76 mm

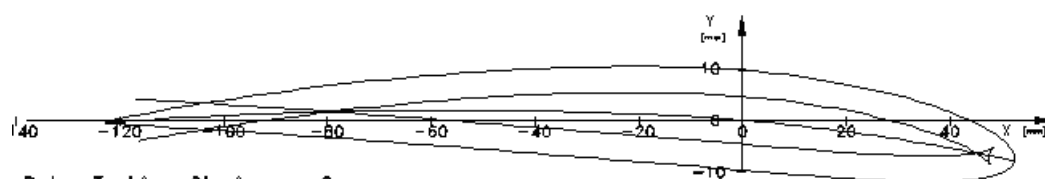


Rotor Turbina Clagi, var. C

Profilul NACA-34109, Cod\_fis:PR

Secțiunea Nr. P3

Raza sect=2215.00 mm

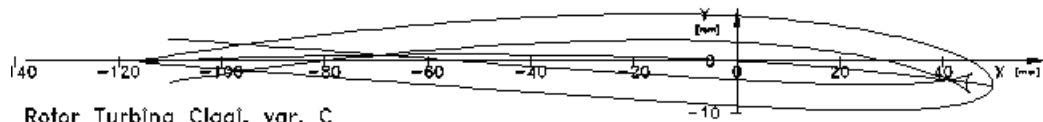


Rotor Turbina Clagi, var. C

Profilul NACA-24102, Cod\_fis:PR

Secțiunea Nr. P4

Raza sect=2221.21 mm

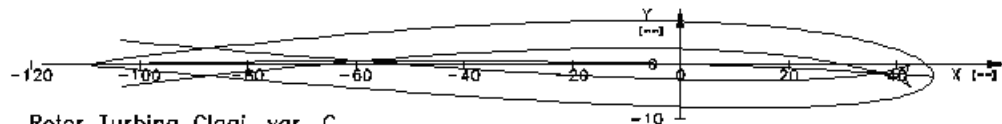


Rotor Turbina Clagi, var. C

Profilul NACA-14095, Cod\_fis:PR

Sectiunea Nr. P5

Raza sect=2226.00 mm

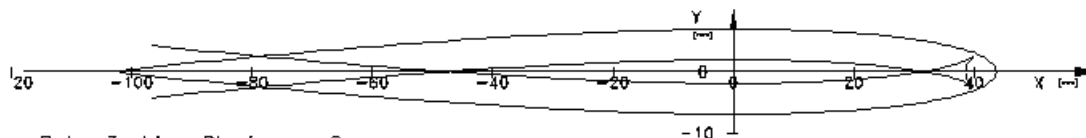


Rotor Turbina Clagi, var. C

Profilul NACA-14087, Cod\_fis:PR

Sectiunea Nr. P6

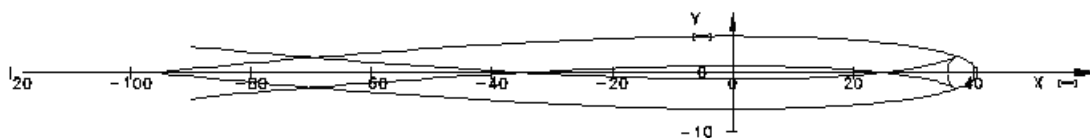
Raza sect=2229.00 mm



Rotor Turbina Clagi, var. C

Profilul NACA-0008 , Cod\_fis:PR

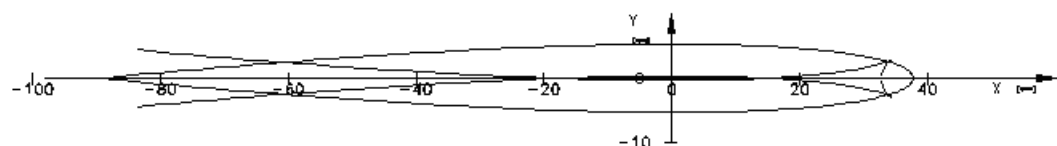
Sectiunea Nr. P7



Rotor Turbina Clagi, var. C

Profilul NACA-0008 , Cod\_fis:PR

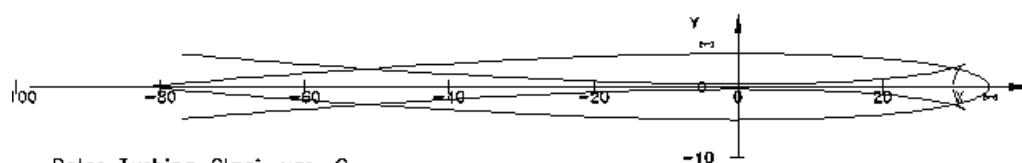
Sectiunea Nr. P8



Rotor Turbina Clagi, var. C

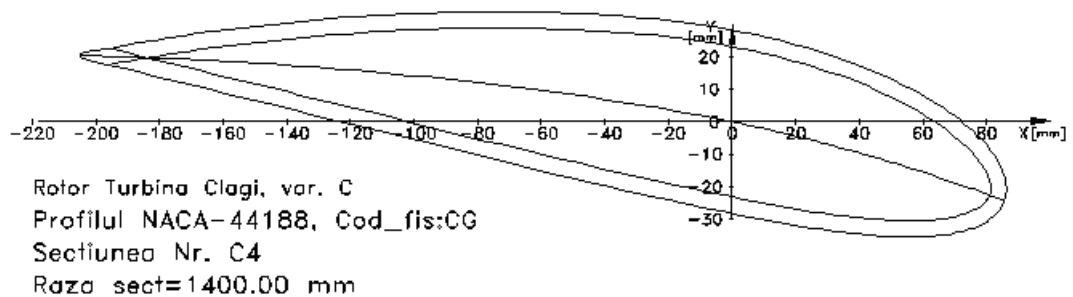
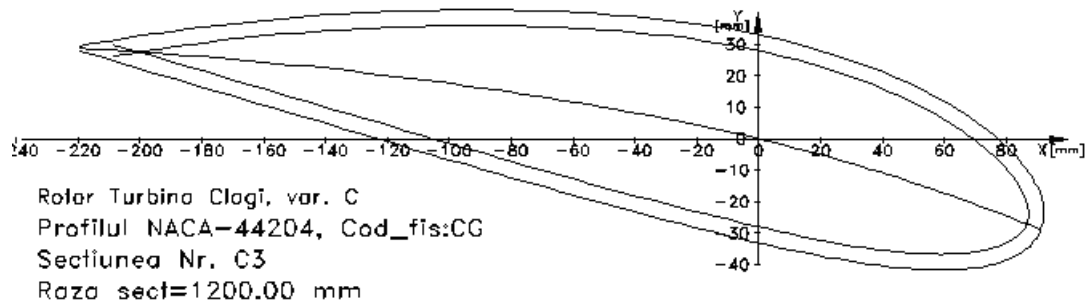
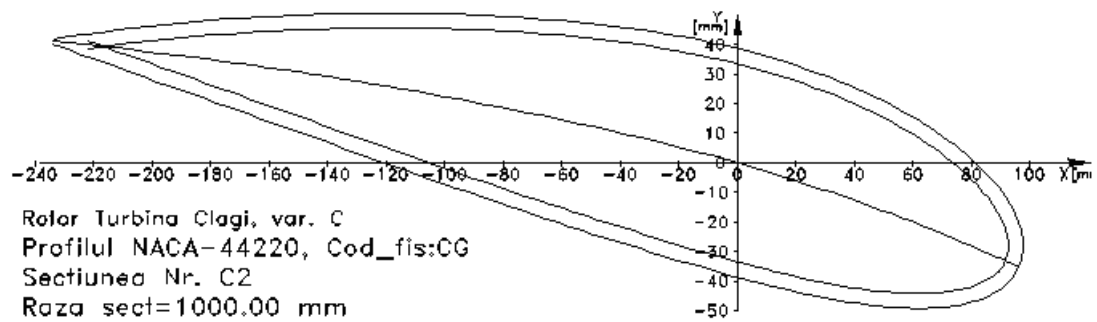
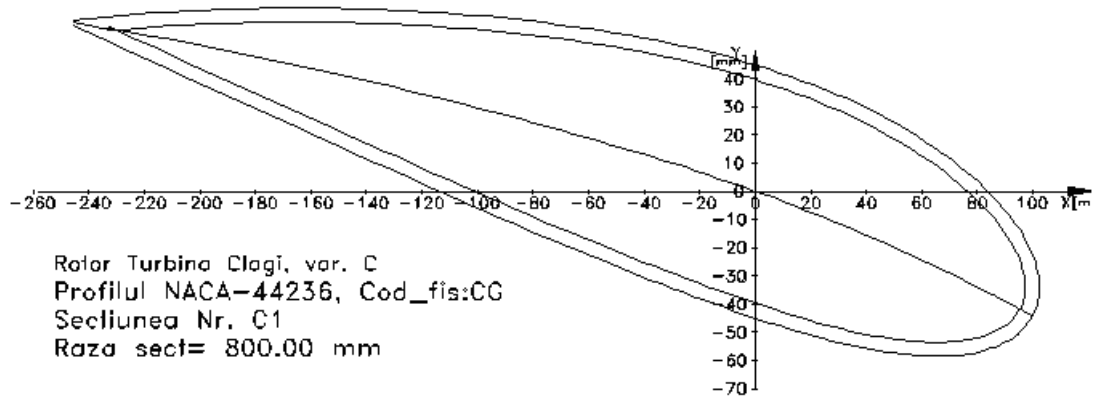
Profilul NACA-0008 , Cod\_fis:PR

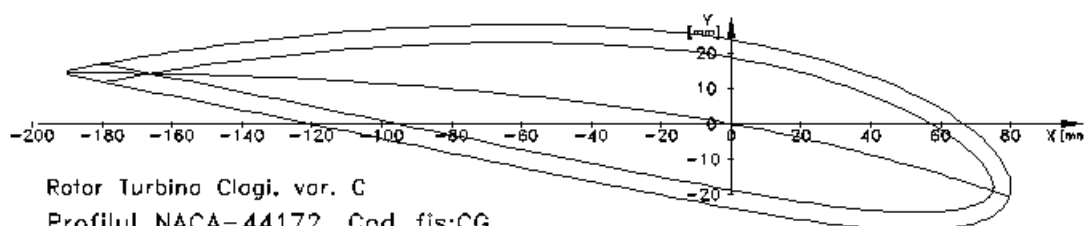
Sectiunea Nr. P9



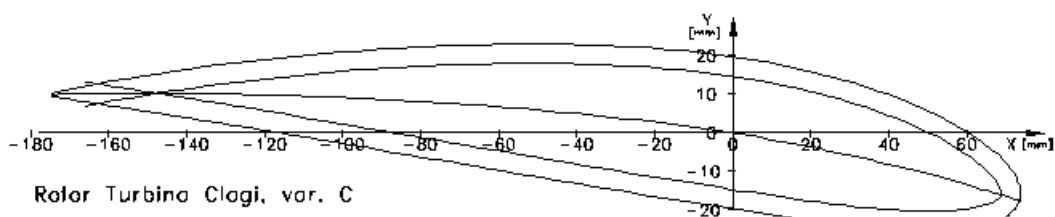
Rotor Turbina Clagi, var. C

Profilul NACA-0008 , Cod\_fis:PR

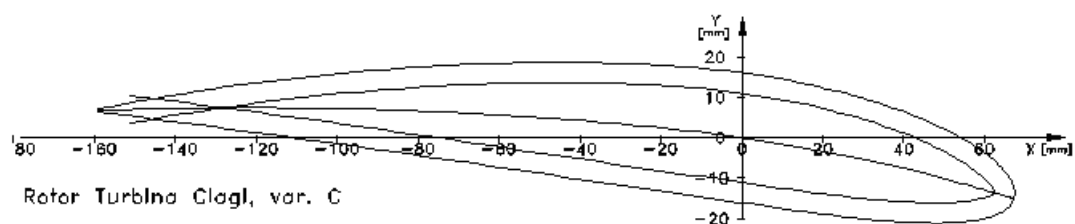




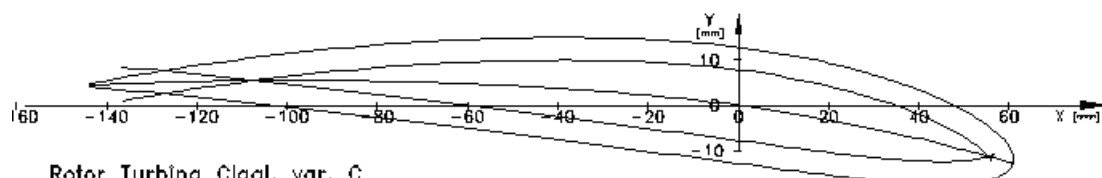
Rotor Turbina Clagi, var. C  
Profilul NACA-44172, Cod\_fis:CG  
Secțiunea Nr. C5  
Raza sect=1600.00 mm



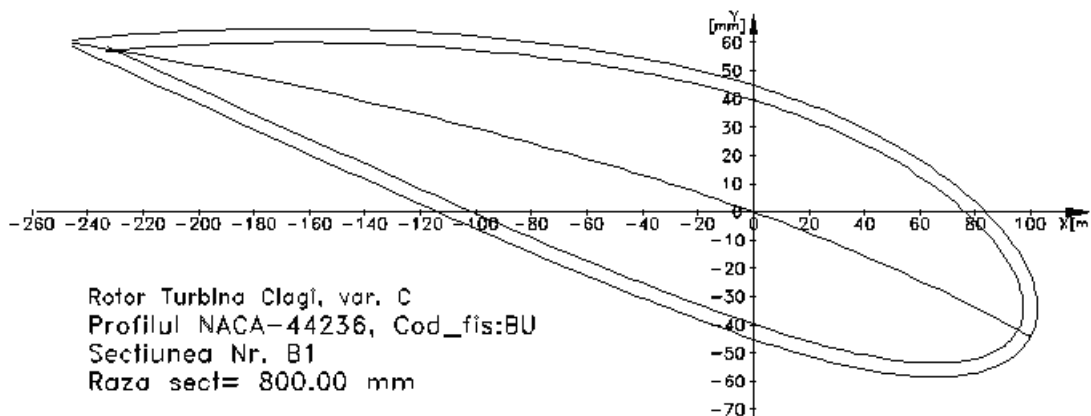
Rotor Turbina Clagi, var. C  
Profilul NACA-44156, Cod\_fis:CG  
Secțiunea Nr. C6  
Raza sect=1800.00 mm



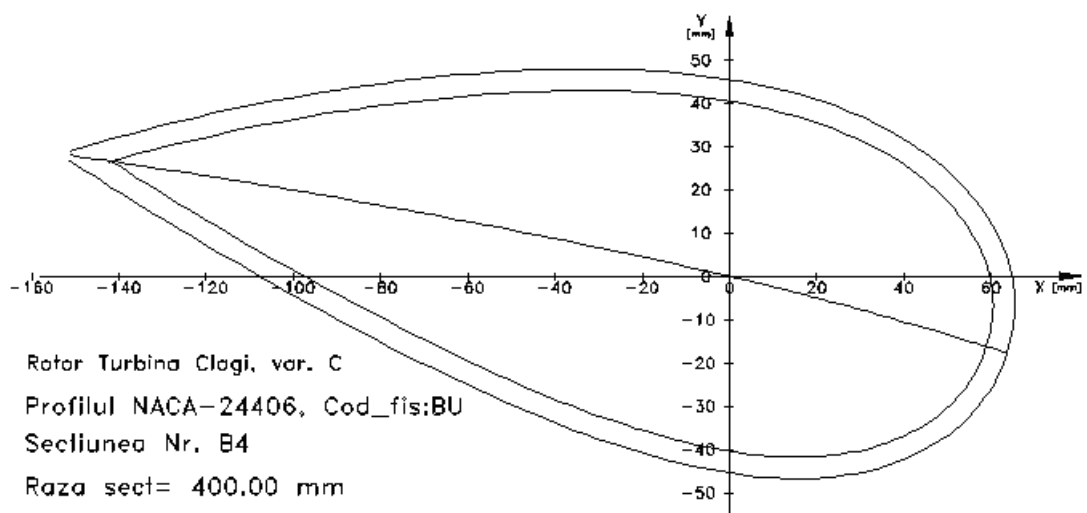
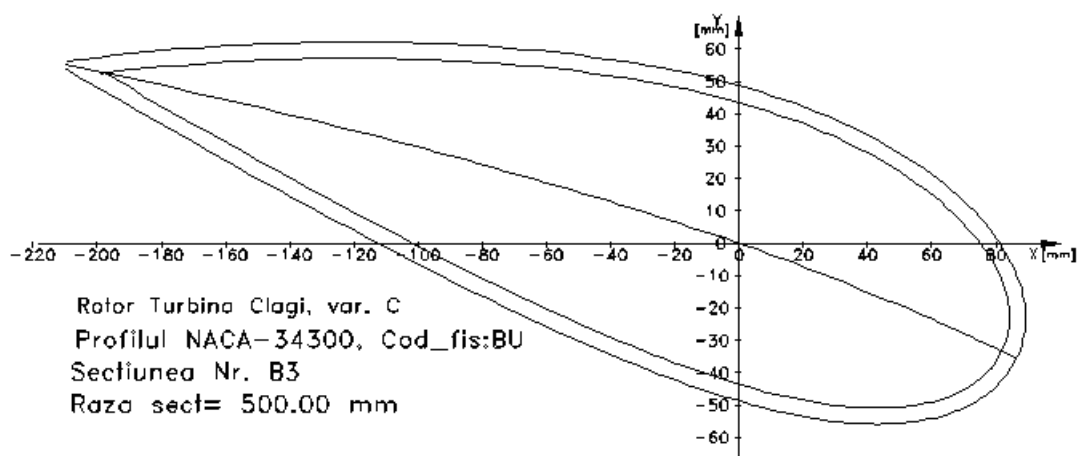
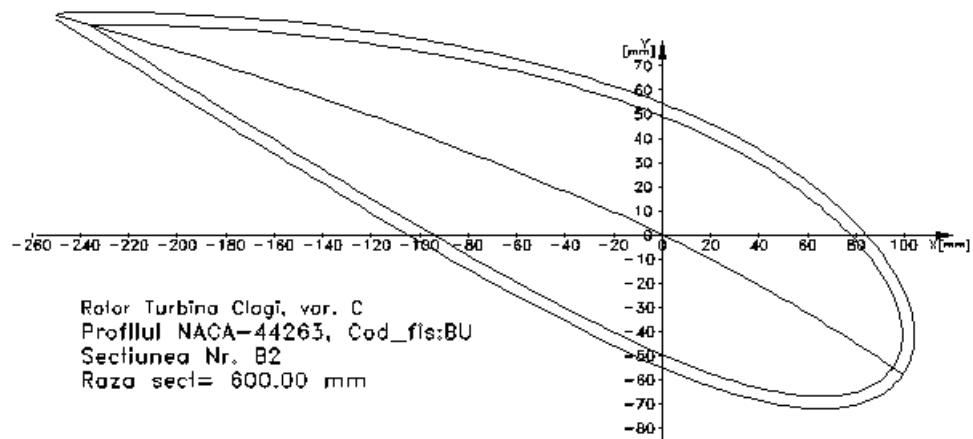
Rotor Turbina Clagi, var. C  
Profilul NACA-44140, Cod\_fis:CG  
Secțiunea Nr. C7  
Raza sect=2000.00 mm

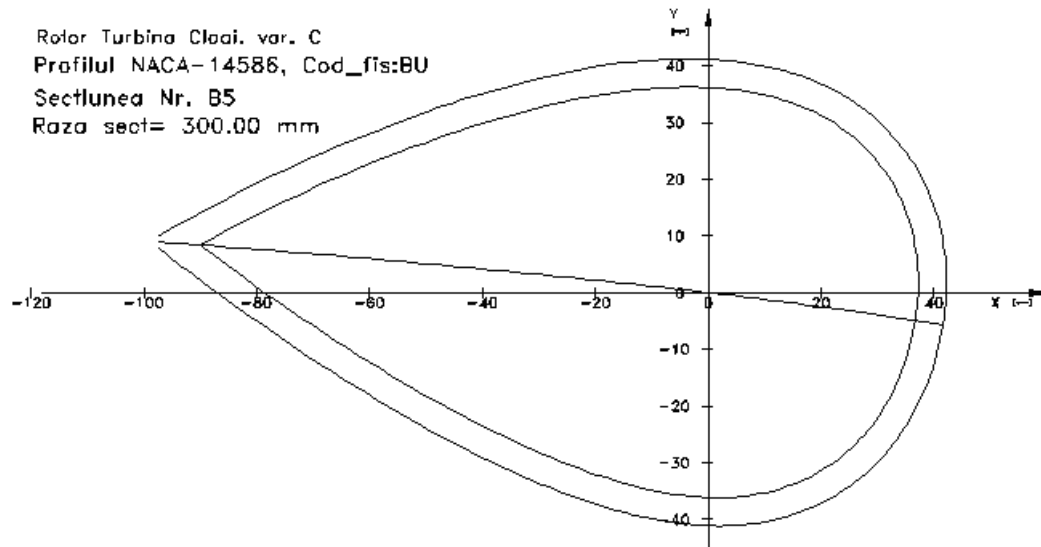


Rotor Turbina Clagi, var. C  
Profilul NACA-44124, Cod\_fis:CG  
Secțiunea Nr. C8  
Raza sect=2200.00 mm

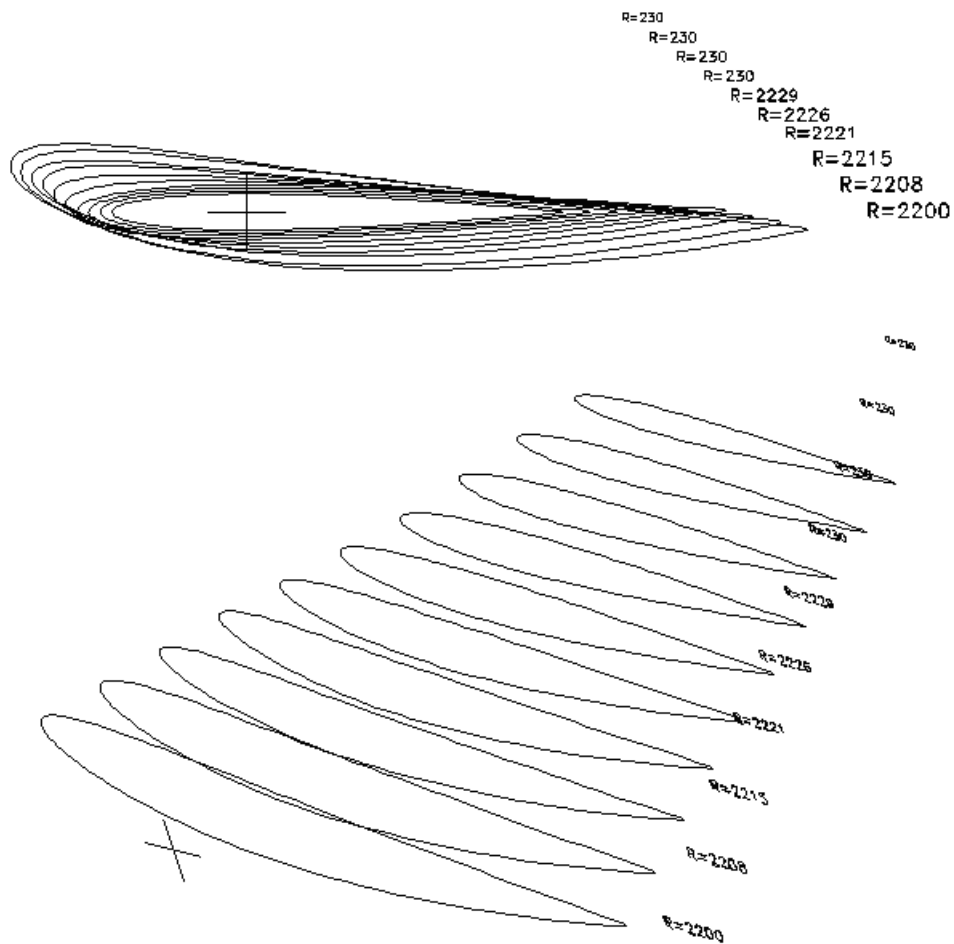


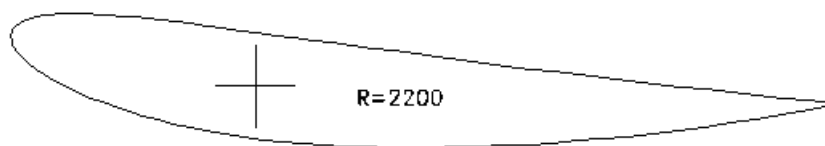
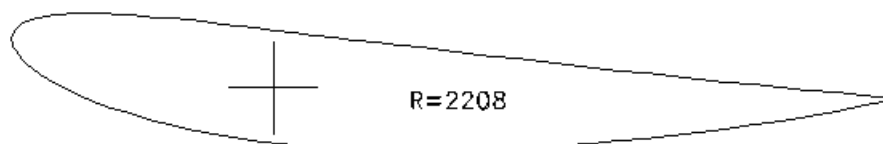
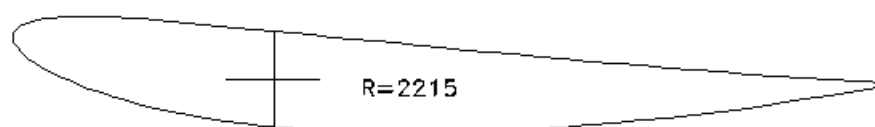
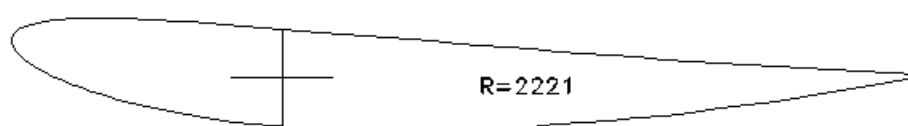
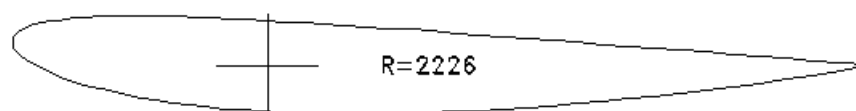
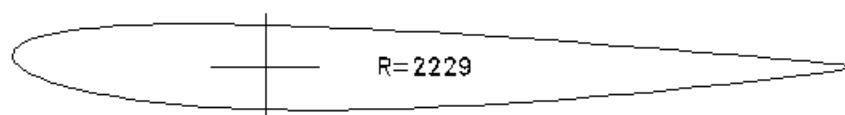
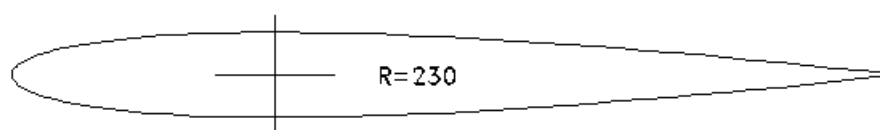
Rotor Turbina Clagi, var. C  
Profilul NACA-44236, Cod\_fis:BU  
Secțiunea Nr. B1  
Raza sect= 800.00 mm



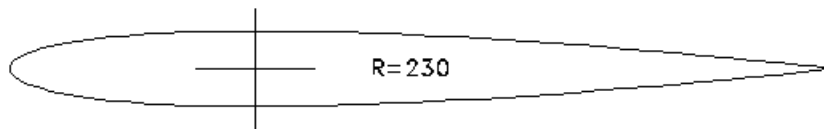


**P (PR) = PERIFERIE**

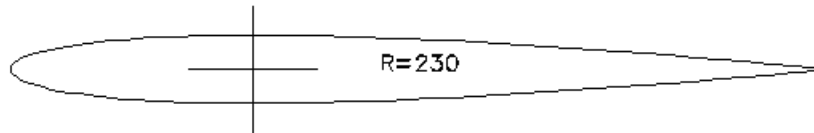


**Secțiunea P1****Secțiunea P2****Secțiunea P3****Secțiunea P4****Secțiunea P5****Secțiunea P6****Secțiunea P7**

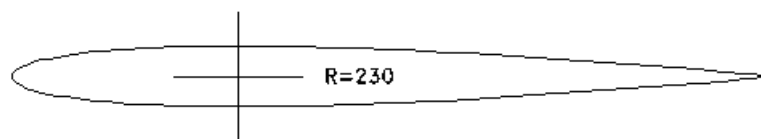
Secțiunea P8



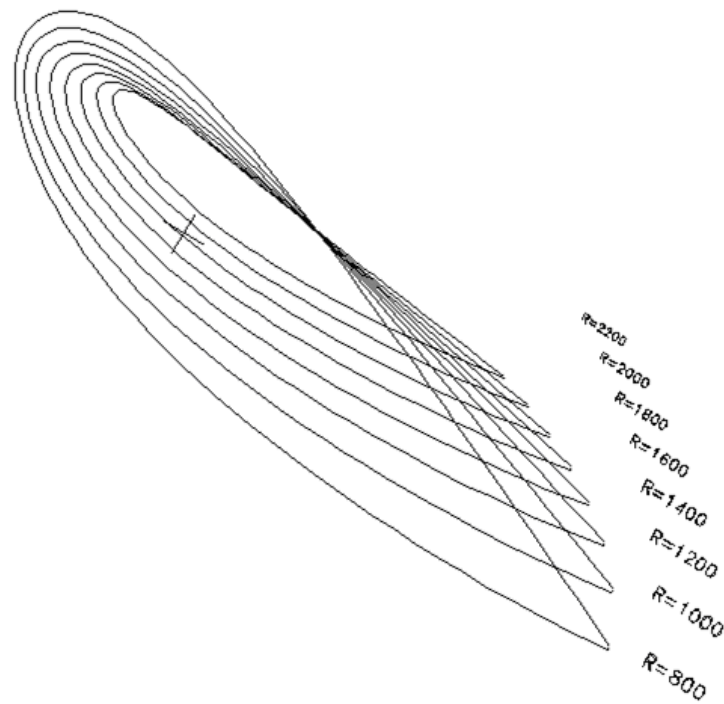
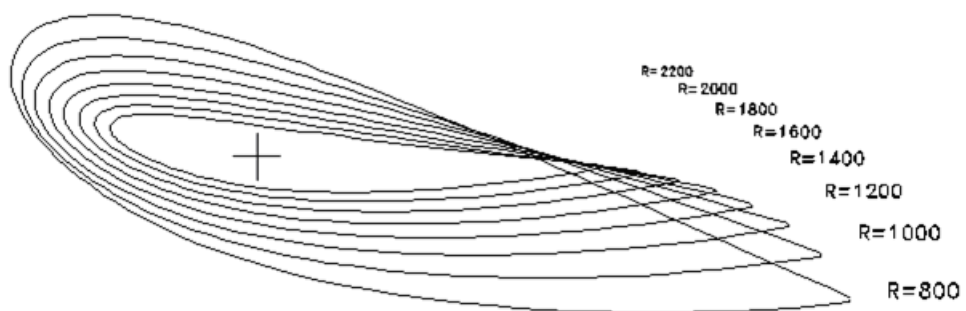
Secțiunea P9



Secțiunea P10

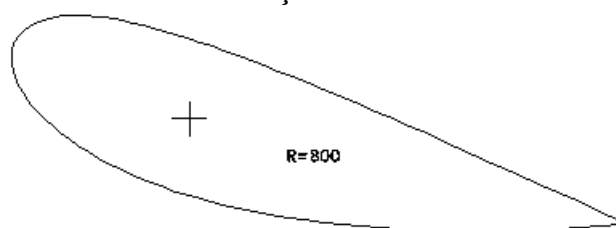


**C (CG) = MIEZ**

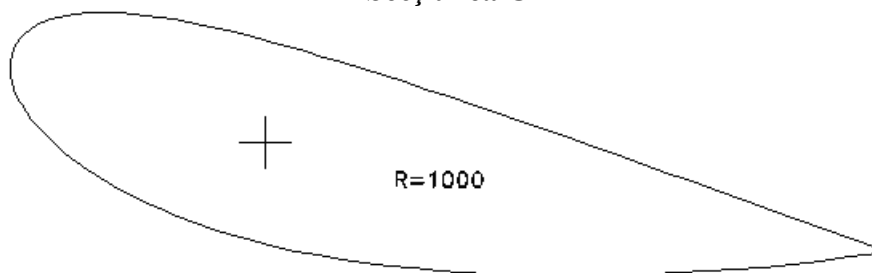




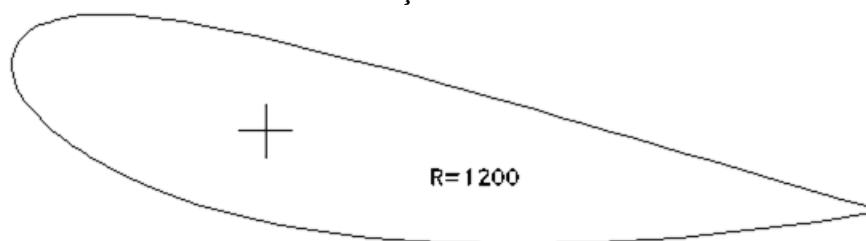
**Secțiunea C1**



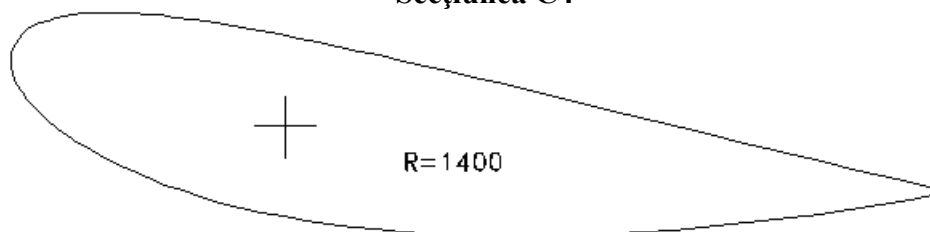
**Secțiunea C2**



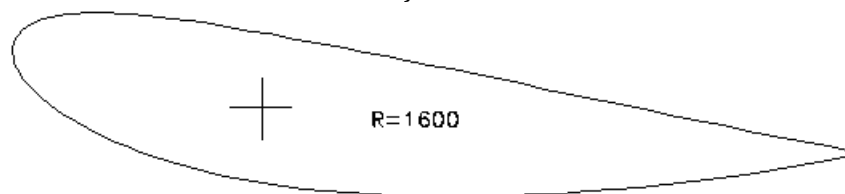
**Secțiunea C3**

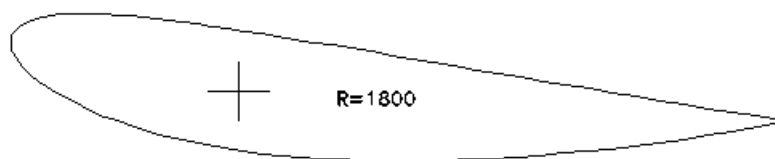
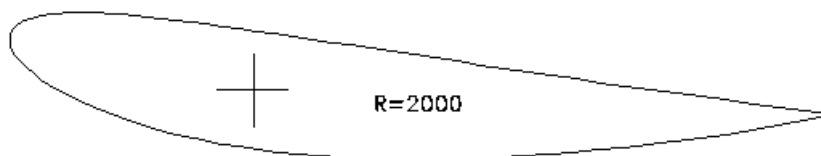
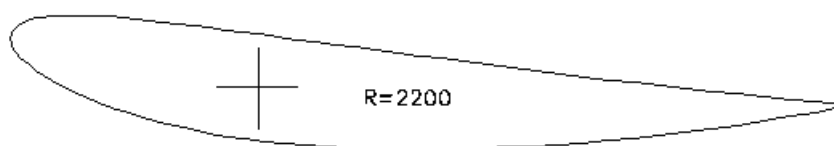
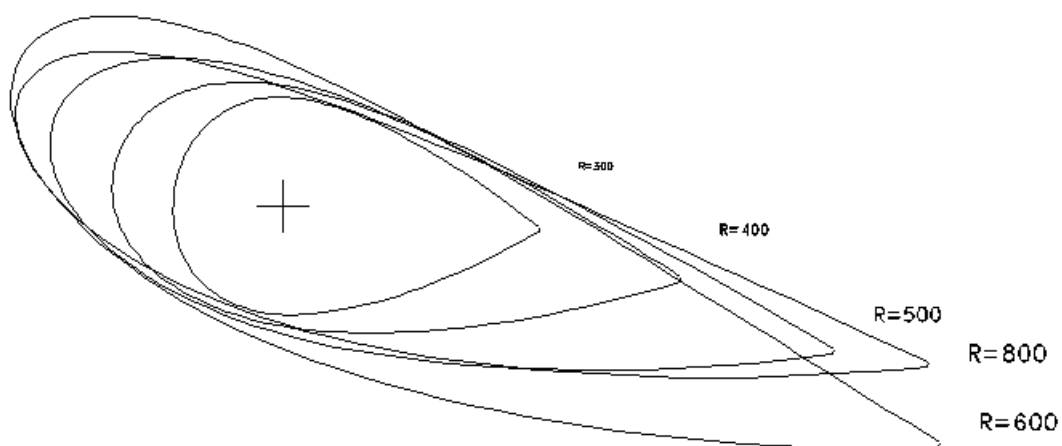


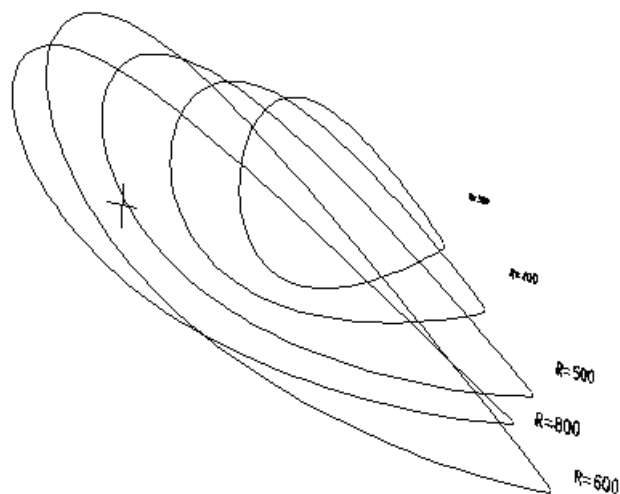
**Secțiunea C4**



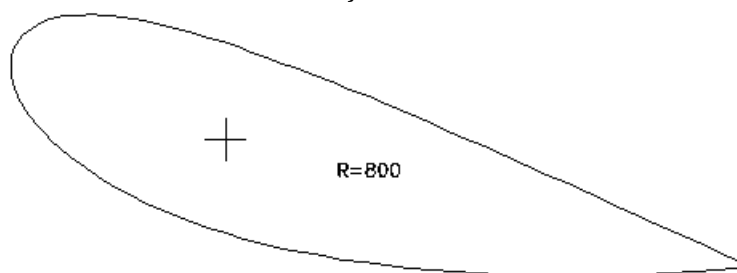
**Secțiunea C5**



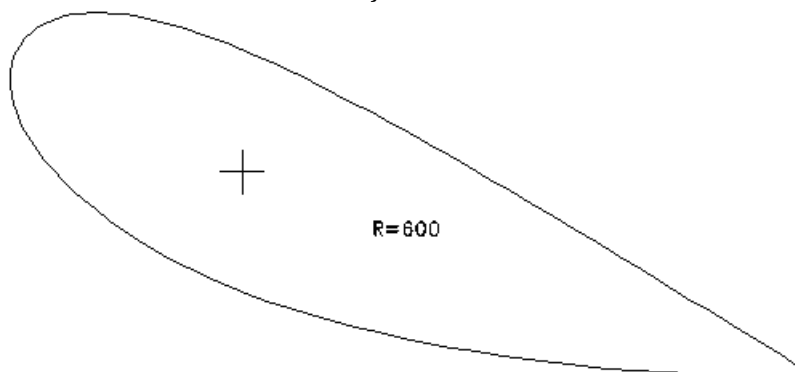
**Secțiunea C6****Secțiunea C7****Secțiunea C8****B (BU) = BUTUC**



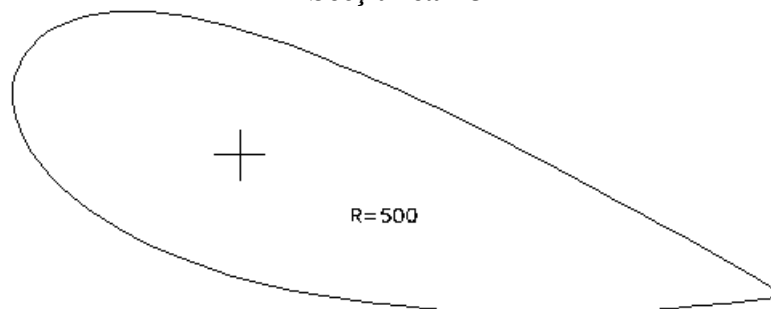
**Secțiunea B1**



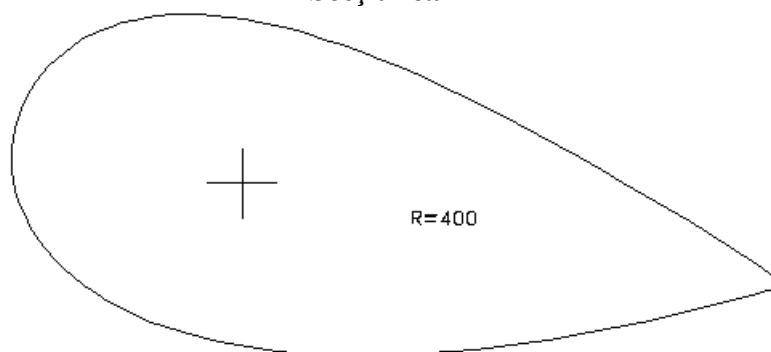
**Secțiunea B2**



**Secțiunea B3**



**Secțiunea B4**



**Secțiunea B5**

